

JRC TECHNICAL REPORTS

Digital Entrepreneurship Barriers and Drivers

*The need for a specific
measurement framework*

Marc Bogdanowicz

2015

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JRC96465

EUR 27679 EN

ISBN 978-92-79-54244-2 (PDF)

ISSN 1831-9424 (online)

doi:10.2791/3112 (online)

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How to cite: M Bogdanowicz (2015); Digital Entrepreneurship Barriers and Drivers. The need for a specific measurement framework; Institute for Prospective Technological Studies; JRC Technical Report EUR 27679 EN; doi:10.2791/3112

Abstract

This report explores the concept of Digital entrepreneurship and 18 current measurement frameworks that support the empirical analysis of entrepreneurship, its determinants, performance and impacts. The report points at the current strengths and weaknesses of the existing measurement frameworks to address the issues of Digital entrepreneurship, and indicates possible ways forward.

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Preface

This report was prepared in the context of the three-year research project on *European Innovation Policies for the Digital Shift* (EURIPIDIS) jointly launched by JRC-IPTS and DG CONNECT of the European Commission in 2013 in order to improve understanding of innovation in the ICT sector and of ICT-enabled innovation in the rest of the economy.¹

The purpose of the EURIPIDIS project is to provide evidence-based support to the policies, instruments and measurement needs of DG CONNECT for enhancing ICT Innovation in Europe, in the context of the Digital Agenda for Europe and of the ICT priority of Horizon 2020. It focuses on the improvement of the transfer of best research ideas to the market.

EURIPIDIS aims are:

1. to better understand how ICT innovation works, at the level of actors such as firms, and also of the ICT “innovation system” in the EU;
2. to assess the EU's current ICT innovation performance, by attempting to measure ICT innovation in Europe and measuring the impact of existing policies and instruments (such as FP7 and Horizon 2020); and
3. to explore and suggest how policy makers could make ICT innovation in the EU work better.

¹ For more information, see the project web site:
<http://is.jrc.ec.europa.eu/pages/ISG/EURIPIDIS/EURIPIDIS.index.html>

Executive Summary

Entrepreneurship, and more recently digital entrepreneurship, has been a key feature of European policies for jobs and growth for more than a decade. As stated by the European Commission,² new firms and small and medium enterprises (SMEs) are major sources of jobs in Europe, hence EU-level policy makers have deemed it essential to improve the climate for SMEs and entrepreneurs.

This report explores the concept of digital entrepreneurship and the current measurement frameworks that support the empirical analysis of entrepreneurship, its determinants, performance and impacts.

The report shows that a robust theoretical economic foundation for entrepreneurship has developed within the Schumpeterian perspective. This theoretical foundation justifies the interest of policy makers in entrepreneurship in advanced economies - an interest that is currently rooted in policies for SMEs and business conditions.

The report documents the consistent efforts to operationalize the theoretical views. These were mainly developed jointly by the OECD and EUROSTAT (Entrepreneurship Indicators Programme, EIP) and led to a consensual definition of entrepreneurship, a structured perspective on the determinants of entrepreneurship and on its economic and social impacts. One of the results was the development of the Business Demographic Statistics.

Adapting the EIP definitions to the specific focus of digital entrepreneurship, the report proposes the following definitions:

- **Digital entrepreneurs** are those persons who seek to generate value, through the creation or expansion of economic activity, by identifying and exploiting new ICT or ICT-enabled products, processes and corresponding markets.³
- **Digital entrepreneurial activity** is the enterprising human action in pursuit of the generation of value, through the creation or expansion of economic activity, by identifying and exploiting new ICT or ICT-enabled products, processes and corresponding markets.⁴
- **Digital entrepreneurship** is the phenomenon associated with digital entrepreneurial activity.

While the expressions 'ICT entrepreneurship' and 'digital entrepreneurship' are widely used, we have opted to use only the expression '**digital entrepreneurship**' in this report as we believe it better reflects the fact that entrepreneurship exists both within and outside the ICT sector.⁵

The above definition of digital entrepreneurship raises two conceptual issues, about which this report includes only a brief summary of the main aspects:

- Is digital entrepreneurship different from entrepreneurship in general?
- What is ICT (enabled-)innovation?

² Source: http://ec.europa.eu/employment_social/esf/docs/sf_entrepreneurship_en.pdf

³ This definition is strongly inspired by the definition developed in the joint OECD-EUROSTAT EIP project. Nevertheless, it might be useful to note that since the notion of innovation has been extended to organisation and marketing innovation (See for example the CIS, 2012). Such extended definition might show highly relevant in the case of digital entrepreneurship.

⁴ Same remark as above about a possible extension of the definition to organisation and marketing innovation.

⁵ A possible alternative would have been to distinguish formally between "ICT entrepreneurship" *within* the ICT sector (sector taxonomy defined by the OECD), and "digital entrepreneurship" as encompassing all such activity *outside* the ICT sector. The option could even limit the use of ICT entrepreneurship to product innovation within the ICT sector. It is not the perspective taken in this report which, in addition, does not ambition to discuss such issues of taxonomy which are better assessed and decided within institutional contexts such as the OECD.

The latter question needs to be answered if we are to establish a targeted measurement framework for digital entrepreneurship.

Additionally, the report investigates the following 12 existing measurement frameworks, selected for being relevant to entrepreneurship:⁶

1. The Entrepreneurship Indicators Programme – EIP (OECD/EUROSTAT).
2. The EIP Demography Statistics (EUROSTAT).
3. Global Entrepreneurship Monitor – GEM.
4. The Global Entrepreneurship and Development Index – GEINDEX.
5. The Regional Entrepreneurship and Development Index – REDI.
6. Digital Entrepreneurship Monitor – DEM.
7. The Community Innovation Survey – CIS (EUROSTAT).
8. Enterprise Surveys (World Bank Group).
9. Doing Business (World Bank Group).
10. EU Flash Barometer Survey on Entrepreneurship (EUROSTAT).
11. Panel Study of Entrepreneurial Dynamics – PSED.
12. Comparative entrepreneurship data for international analysis – COMPENDIA.

Also, the following 6 mapping frameworks are briefly described:

1. Start up Genome,
2. Compass,
3. SEP Monitor- Startup Europe Partnership Scale-Ups Mapping,
4. Cambridge Cluster Map,
5. Dynamic Mapping of web entrepreneurs and start-ups ecosystem,
6. European ICT Poles of Excellence (EIPE).

This investigation leads to the following main observations:

- the large majority of the above frameworks have no or weak links with innovation, the central concept of entrepreneurship in the Schumpeterian perspective.
- most of these frameworks focus on the creation of new firms and neglect the entrepreneurial activity within existing firms.
- finally, the ICT dimension is usually absent.

These three missing aspects – innovation, 'intrapreneurship', and ICT – mean that there is little support for digital entrepreneurship policy making in the current empirical frameworks and their results. The report calls for new measurement frameworks that could become the fundamental building blocks for this kind of policy.

Fortunately, several of the existing measurement frameworks have relevant features in their questionnaires and/or indicators' lists. These frameworks could serve as the basis and inspiration for the elaboration of a measurement framework which targets digital entrepreneurship. The work developed within the Global Entrepreneurship Monitor (GEM), the Global Entrepreneurship Index (GEDI), the Enterprise Survey of the World

⁶ The inventory and the descriptions were closed on December 2014. To the best of his knowledge, the author is not aware of any new initiatives that would have solved the issues described in this report.

Bank and the experience gathered by the EUROSTAT's Community Innovation Survey could contribute much to the elaboration of a relevant tool.

The report recommends that these existing measurement frameworks be used to create a new tool targeted at data collection and analysis of digital entrepreneurship in support of policy making for the long-term conception, monitoring and evaluation of European digital entrepreneurship policies.

From the information gathered while elaborating this report, three operational options emerge:

1. The large body of surveys, analysis and research on the Global Entrepreneurship Monitor (GEM) and the Global Entrepreneurship Index (GEDI) testify to two decades of academic work and policy support. These tools (surveys and expert analysis) and results could directly support a digital entrepreneurship policy at European or Member State level. Adapting their existing theoretical and empirical frameworks to digital entrepreneurship would allow us to benefit from past and current analysis capacity.
2. The Community Innovation Survey (CIS) is an iconic European survey which explores innovation at firm level. While it serves different purposes, expanding the range of its questions, adapting some of its structural characteristics (panel) and/or bridging its micro-data with other existing surveys could be envisaged. This would allow us to document empirically aspects that are relevant to digital entrepreneurship. Of course, this is a longer-term objective as the CIS results arise from a negotiated approach of all European Member States and their National Statistical Institutes.
3. Recently a range of mapping initiatives have been undertaken to investigate the existence and dynamics of digital start-ups and their ecosystems. These initiatives could be specifically nurtured bearing in mind that they were, more than other measurement frameworks, designed ex-ante to focus on ICT.

The renewed political interest in digital entrepreneurship calls for further empirical evidence. Current policies still rely on past concepts, tools and analysis that mainly address SMEs and business demographic issues, and usually leave aside innovation, technology and in-house entrepreneurial activity.

Contemporary economic and political thinking deserves a better understanding of the nexus entrepreneurship / ICT-enabled innovation / economic growth.

The report suggests that empirical tools still need to be developed that would allow us to gather and analyse the evidence about digital entrepreneurship that is necessary for the conception, implementation, monitoring and evaluation of policies.

The report has three chapters: Chapter 1 explores the theoretical aspects of entrepreneurship, Chapter 2 looks at its measurement frameworks, and Chapter 3 offers some conclusions.

1 Towards a definition of digital entrepreneurship

1.1 The theoretical framework

In contemporary economic theories, entrepreneurial activity⁷ is seen as a central engine – if not the prime agent – of the market economy.

As noted by the OECD, most people refer to Cantillon (1755)⁸ when tracing back the theory of entrepreneurship. In his treatise, written during the early stages of capitalism, entrepreneurship and the figure of the entrepreneur were already present in what is considered to be one of the foundations of classical economics. However, Schumpeter is seen as the father of the contemporary version of entrepreneurship.

1.1.1 Entrepreneurship and creative destruction

The theoretical framework of entrepreneurship was developed by Schumpeter (1912, translated in 1934).⁹ Thus, the first contemporary fundamental insights into the economic role of entrepreneurship date as far back as to the early 20th century.

"In his seminal work (...) "The Theory of Economic Development" (Schumpeter 1934), Schumpeter tried to develop an entirely new economic theory based on change—as opposed to equilibrium. Distinguishing between 'economic growth' in the stationary state and 'economic development' (the creation of new opportunities through 'creative destruction'), he discussed the function of the entrepreneur as an individual who tends to break the equilibrium by introducing innovations ("new combinations") into the system." (Carlsson et al, 2013, pp.6-7). Innovation is centre stage in Schumpeter's ideas on creative destruction.

Schumpeter's view on innovation¹⁰

Schumpeter (1934) describes economic development as substantially driven by innovation that could be of five types:

- launch of a new product or a new species of already known product;
- application of new methods of production or sales of a product (not yet proven in the industry);
- opening of a new market (the market for which a branch of the industry was not yet represented);
- acquisition of new sources of supply of raw material or semi-finished goods;
- emergence of a new industry structure, brought about, for example, by the creation or destruction of a monopoly position.

Schumpeter sees entrepreneurship as the engine of creative destruction within the market economy, which "not only never is, but never can be stationary. [...] The fundamental impulse that sets and keeps the capitalist engine in motion comes from the new consumers' goods, the new methods of production or transportation, the new markets, the new forms of industrial organization that capitalist enterprise creates. [...] The opening up of new markets, foreign or domestic, and the organizational development from the craft shop [...] incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one. This process of creative destruction is the essential fact about capitalism." (Schumpeter, 1994, [1942]. Capitalism, Socialism and Democracy. pp. 82–83)

⁷ The terms Entrepreneurship and Entrepreneurial activity are used as equivalent in this report.

⁸ Cantillon's "Essai sur la nature du Commerce en General" was written in 1755.

⁹ "Theorie der Wirtschaftlichen Entwicklung", 1912. The second edition was translated and published in 1934.

¹⁰ This Schumpeterian classification of innovation has become mainstream in literature and in the works of the OECD and EUROSTAT.

In contemporary economics, Schumpeter is presented as the first economist who established a link between innovation, entrepreneurship and economic development. His approach is based on change (rather than equilibrium), where the entrepreneur, by breaking the equilibrium with innovations makes economic development possible through creative destruction. This puts the entrepreneur, and entrepreneurship as an activity, at the core of "restless capitalism".

"Such systems cannot be usefully described as existing in or tending towards a given equilibrium, they are restless systems always generating challenges to the status quo. Any novelty generating system is restless precisely because knowledge is restless, indeed we shall think of a modern capitalist economy as a system organised and instituted for the continuous creation of business experiments, very many of which come to nought but, in which, as in all evolutionary systems, a few outliers have quite disproportionate transformative effects. From this viewpoint innovations are the primary, variety generating events; they are instabilities from the point of the status quo, emergent novelties that invade the prevailing economic order. Emergent novelty is essential to development but it is also augmented by market processes through which these innovations displace already established activities. Consequently, a completely stable capitalism would be a stationary capitalism, a contradiction in terms as Marshall and Schumpeter knew very well." (Metcalf, 2012)

And the same author continues, establishing the link with policy: "(...) The corollary is that much that is tried fails, any experimental system proceeds by trial to discover error and so there is an inevitable waste of resources and evidence of inefficiency when we appraise with the benefit of hindsight.¹¹ It follows that innovation policy is ultimately concerned with the generation of novelties, the "hopeful monsters" that may transform the world of production."

Evolutionary economics: a step away from neoclassical theory

Schumpeter's theory of entrepreneurship is a step away from neoclassical economics. Casson (1982) explains that this is due to the neoclassical "very extreme assumptions about access to information. Simple neoclassical models assume that everyone has free access to all the information they require for taking decisions. This assumption reduces decision making to the mechanical application of mathematical rules for optimization. It trivializes decision making, and makes it impossible to analyse the role of entrepreneurs in taking decisions of a particular kind." Wennekers and Thurik (1999) similarly explain that "The neo-classical model, with its production function, the internal logic of rational choice and perfect information, leaves no room for an active entrepreneur".

Furthermore, Carlson explains that "Schumpeter's analysis has remained a basic point of reference for many of his successors, especially for those who follow his tradition of regarding the entrepreneur as an innovative path breaker (...). But it was not until Schumpeterian analysis made a come-back in the form of evolutionary economics, and industrial economics became more dynamic based on a new theory of the firm and the emergence of game theory, breaking away from standard neoclassical economics, that the entrepreneur began to be incorporated in economic analysis."

This perspective determines the role of entrepreneurship: "Evolutionary development depends crucially on the exercise of economic imagination and on acts of enterprise. Entrepreneurial behaviour is crucial to the evolutionary dynamic and every entrepreneur conjectures that the prevailing order can be improved upon, (...)." (Metcalf et al, 2012)

¹¹ Schumpeter also expressed the view that "a majority of would be entrepreneurs never get their projects under sail and that, of those that do, nine out of ten fail to make a success of them " (1939, p.117)

1.1.2 *The role of small and large firms in entrepreneurial activity: from entrepreneur to intrapreneur*

Schumpeter, shifting from his Mark I (1912) to his Mark 2 (1942) theories,¹² integrated observations about changes in the size-class distribution of firms in the (American) economy and speculated about their possible influence on growth. Since his Mark 2 theories, "(Schumpeter) claimed that, in the further development of capitalism, the role of the promoter-entrepreneur would be replaced by large, bureaucratic corporations and trusts and, thus, omitted the original psychological, motivational foundations of his entrepreneurial theory (...). What he emphasized instead were the concomitants of the routine-like innovativeness of the large trusts: unprecedented economic growth and productivity increases on the one side and monopolistic practices necessary to protect the investments into innovations on the other. By arguing that it is not possible to have the one without the other, he challenged the established ideal of perfect competition." (Witt U., 2008, p.555-556).

Thus, Schumpeter shifted from his initial exclusive focus (in 1912) on newly-created entrepreneurial firms in the process of creative destruction, to including large corporations among the main players.

Since then, theory has expected entrepreneurial activity to be observable both in small new companies and in large corporations, and essential creative destruction to be fostered by either type of firms.

In line with this view, the OECD stated in its report "Fostering Entrepreneurship" (1998):¹³ that "Entrepreneurship is central to the functioning of market economies. Entrepreneurs are agents of change and growth in a market economy and they can act to accelerate the generation, dissemination and application of innovative ideas. In doing so, they not only ensure that efficient use is made of resources, but also expand the boundaries of economic activity. Entrepreneurs not only seek out and identify potentially profitable economic opportunities but are also willing to take risks to see if their hunches are right." (OECD, 1998, p.12).¹⁴ The agents of change, as named here, could be either entrepreneurs creating new firms or large corporations, carrying out entrepreneurial activity.

As with Schumpeter's theories, it is noticeable that theoretical focus continues to shift with time between small new companies and large corporates. Since the 90s, the main focus has shifted back to the prevalence of smaller firms in growth of employment and wealth.

Many authors associate this renewed political and scientific interest in small firms and entrepreneurship with an observed prevalence of economic activity (Employment, value, etc.) among small firms since the 1970-80s, at least in developed economies (Wennekers S., Thurik, R. 1999; Carlsson, 1992 and 1999).

¹² The Theory of Economic Development (Schumpeter 1912, 1934) is dedicated to the presentation of a model that describes economic evolution as the interaction between new innovative firms and the system of economic routines. This model has been called Schumpeter's Mark I model. The second part of Capitalism, Socialism and Democracy from (Schumpeter, 1942) presents, much more sketchily, two additional models. The most obvious is the Mark II model that depicts economic evolution as a process that is driven by the innovative oligopolistic competition between larger firms. (Andersen E.S.)

¹³ This report is one out of several issued in a joint OECD-EUROSTAT project called Entrepreneurship Indicators Project (EIP).
More at: <http://www.oecd.org/industry/business-stats/theentrepreneurshipindicatorsprogrammeeipbackgroundinformation.htm>

¹⁴ It is noticeable that in this paper, contrary to its methodological ones, the OECD takes a strictly optimistic stance about entrepreneurship: no notion of trials or failure is included and resources are seen as used efficiently.

Wennekers (1999) further states that the "re-evaluation of the role of small firms is related to a renewed attention to the role of entrepreneurship. If the size class distribution has an influence on growth, it must be differences in organization that matter. The major difference between the organization of a large firm and a small one is the role of ownership and management."

Carlsson (1999) proposes two explanations for this shift in the economy: global competition and the impact of technological progress in industrialized countries. Similarly, the Regional Entrepreneurship Development Index (REDI, 2013) states:¹⁵ "The shift from a 'managed' economy to an 'entrepreneurial' economy is among the most important challenges developed economies have faced over the last few decades. This challenge is closely coupled with the increasing importance of non-physical capital, such as human and intellectual capital for wealth creation. The most notable signs of this shift are the following:

1. knowledge is increasingly replacing physical capital and labour as the key driving force of economic growth;
2. individuals rather than large firms are the leaders in new knowledge creation;
3. along with large conglomerates, new and small firms play a dominant role in translating newly-created knowledge into marketable goods and services;
4. traditional industrial policy, with antitrust laws and small business protection, has been replaced by a much broader entrepreneurship policy aiming to promote entrepreneurial innovation and facilitate high-growth potential start-ups."

Also, the European Commission's Green paper on entrepreneurship (2003) observes: "In the middle of the last century, economists predicted the dominance of large firms. Size was needed to obtain economies of scale, to exploit foreign markets and to keep abreast of regulations and of new opportunities in technology. Indeed, in the 1960s and 1970s, large companies dominated the economy. Since then, the trend has started to reverse. Large firms rationalised by restructuring, outsourcing or downsizing and the number of business owners in OECD countries increased from 29 million to 45 million between 1972 and 1998."¹⁶

Structural changes in the economy shifted Europe's comparative advantage towards knowledge-based activities. Globalisation increased competitive pressure on manufacturing firms in high-cost locations, which led not only to a shift in production capacity to low cost countries,¹⁷ but also to increasing productivity by using technological inputs. Meanwhile 'Information and Communication Technologies' (ICTs) gave rise to new markets, such as personal computers, software and ICT-based services, which revolutionised production processes in many industries and led to growth of the service sector." (European Commission, 2003)¹⁸

This same document defines entrepreneurship as "the mindset and process to create and develop economic activity by blending risk-taking, creativity and/or innovation with sound management, within a new *or an existing* organisation."¹⁹ Similarly, the corresponding policy summary published by the Commission states: "Entrepreneurship is an individual's creative capacity, independently *or within* an organisation,²⁰ to identify an opportunity and to pursue it in order to produce new value or economic success."²¹

¹⁵ Acs Z.J., Szerb L., Autio E. Ortega-Argiles R. Komlosi E. (2013)

¹⁶ 'Entrepreneurship: Determinants and policy in a European US comparison', David B. Audretsch et al., 2002.

¹⁷ Between 1991 and 1995, manufacturing employment in German plants decreased by 1 307 000 while it increased in foreign subsidiaries by 189 000, 'Entrepreneurship: A survey of the Literature', David B. Audretsch, October 2002.

¹⁸ Available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52003DC0027..>

¹⁹ Author's highlighting.

²⁰ Author's highlighting.

²¹ Available at: http://europa.eu/legislation_summaries/other/n26023_en.htm (last update in 2007)

Supported by a century of economic literature, entrepreneurship is seen as the engine of the market economy. It can develop within existing companies expanding their activities through innovation, just as much as it can through newly-created young innovative firms.

But what is entrepreneurial activity? What are its main characteristics?

1.2 Towards a definition of entrepreneurship

1.2.1 A century of debate

Quite paradoxically, "the entrepreneur is (...) one of the most intriguing and one of the most elusive characters in the cast that constitutes the subject of economic analysis. He has long been recognized as the apex of the hierarchy that determines (...) the vitality of the free enterprise society. (...) though he remained a shadowy entity without clearly defined form and function. Only Schumpeter (...) succeeded in infusing him with life and in assigning to him a specific area of activity (...)." (Baumol, 1968)

At the historical roots, Schumpeter wrote: "(A)n entrepreneur is a person who carries out new combinations, which may take the form of new products, processes, markets, organizational forms, or sources of supply. Entrepreneurship is, then, the process of carrying out new combinations"²², and that an entrepreneur takes the "risk and responsibility in designing and implementing a business strategy or starting a business".²³

Schumpeter portrayed the fundamental aspects of entrepreneurship, which theory would later follow, adapting and sometimes contradicting his views:

- innovation is at the core of the activity, expressed as new combinations which may take the form of new products, processes, markets, organizational forms, or sources of supply
- risk is an inherent characteristic of the entrepreneurial activity
- the activity can be located within an existing firm (new business strategy) or outside (by starting a new business).

In line with these theoretical foundations of entrepreneurship, many authors offered additional definitions of entrepreneurship.

Shane and Venkataraman (2000), whose conceptual paper is quoted by many authors in the entrepreneurship literature, state that "The entrepreneurial function implies the discovery, assessment and exploitation of opportunities, in other words, new products, services or production processes; new strategies and organizational forms and new markets for products and inputs that did not previously exist."

Casson (1982 and 2003, p.20)²⁴ states that "an entrepreneur is someone who specializes in taking judgmental decisions about the coordination of scarce resources". Casson indicates that "a judgmental decision is one where different individuals, sharing the same objectives and acting under similar circumstances, could make different decisions. The differences arise because they have different perceptions of the situation, due to different access to information (...)."

Cuervo et al. (2008) state: Entrepreneurship "includes the identification and assessment of opportunities, the decision to exploit them oneself or sell them, efforts to obtain resources and the development of the strategy and organization of the new business project (...)."

²² Quoted by Sharma P. and Chrisman J.S. (2007).

²³ Idem.

²⁴ Similar definitions were given by Casson already in 1982, Hébert and Link in 1989.

Casson's and Cuervo's definitions omit the innovative drive of entrepreneurship, equating it implicitly with the creation of any new firm or new business activity. This is a conceptual choice that has often affected empirical frameworks, as this report shows in the following chapters.

Sharma P. and Chrisman J.S. (2007), referring to a broad review of definitions established by Gartner W.B. (1990), explain that the author "identified two distinct clusters of thought on the meaning of entrepreneurship. The first group of scholars focused on the characteristics of entrepreneurship (e.g. innovation, growth, uniqueness, etc.) while the second group focused on the outcomes of entrepreneurship (e.g. creation of value). Scholars who subscribe to the notion that entrepreneurship should be defined by its characteristic attributes appear to be, the largest group, accounting for 79% of Gartner's sample."

All in all, the variety of definitions found in literature can be attributed to the differentiated focus of their authors, often due to the main interests and scientific discipline of these.

Generally speaking, the definitions of entrepreneurial activity include the five following aspects, with variable insistence, in the many definitions to be found in literature:

- the innovative drive of entrepreneurship (seeking opportunities, inventing combinations, etc.), usually rooted in the work of Schumpeter
- the characteristics of the entrepreneur (sensitive to opportunities, judgement capacity, risk taking, etc.)
- the creation of a new business activity, as firm or as in-house new business activity
- the management/organisation of the new business
- the resulting value creation.

1.2.2 A consensual definition of entrepreneurship

Since 2006, a consensual framework for entrepreneurship has been developed within the Entrepreneurship Indicators Programme (EIP),²⁵ a joint initiative of OECD/ EUROSTAT.

The EIP came up with the following operational definitions:²⁶

- **Entrepreneurs** are those persons (business owners²⁷) who seek to generate value, through the creation or expansion of economic activity, by identifying and exploiting new products, processes or markets.²⁸
- **Entrepreneurial activity** is the enterprising human action in pursuit of the generation of value, through the creation or expansion of economic activity, by identifying and exploiting new products, processes or markets.
- **Entrepreneurship** is the phenomenon associated with entrepreneurial activity.

The above definitions articulate the main aspects of the theoretical framework: the innovation drive, the new business project and the creation of value. Less emphasis is

²⁵ See at:
<http://www.oecd.org/industry/business-stats/theentrepreneurshipindicatorsprogrammeeipbackgroundinformation.htm>

²⁶ Ahmad N., Seymour R.G., 2008.

²⁷ About the meaning of this parenthesis, the OECD author explains: "In offering these definitions, we realise that they cover only a subset of entrepreneurial activities, as they focus on business owners. The focus on business-related entrepreneurship does not imply that other forms of entrepreneurship are unimportant. It simply reflects a conscious decision to orient the definition towards the economic policy interests of OECD, EU and other countries." Ahmad N., Seymour R.G., 2008, p.10.

²⁸ The term "markets" is probably the most open to interpretation in those definitions. Shane and Venkataraman (2000) propose the following definition: "discovery, assessment and exploitation of new markets for products and inputs that did not previously exist."

given, maybe, to the individual characteristics of the entrepreneur or the managerial facet of entrepreneurship.²⁹

In these definitions, innovation is given, literally, its Schumpeterian definition: new products, processes or markets. This definition excludes implicitly two of Schumpeter's types of innovation: acquisition of new sources of supply of raw materials or semi-finished goods; and the creation of a new industry structure. No explanation is given for this omission.

The role played by entrepreneurial activity of large corporations is acknowledged. OECD (2011) states: "(...) (E)ntrepreneurs and entrepreneurship are not concepts that relate exclusively to small businesses or the self-employed, as many studies, through expedience, have often assumed. The EIP view is that the creation of value through the identification and exploitation of new products, processes and markets is not uniquely the preserve of small companies or entrepreneurs (...). Clearly, large companies can be entrepreneurial and these companies should not be ignored when formulating entrepreneurship policies." In this definition, the notion of expansion of the economic activity refers to this aspect.

The status of value creation is widened. Both monetary and non-monetary returns are said to be acknowledged outcomes of the process: "The final point concerns "value". Policy makers are interested in facilitating or encouraging the growth of entrepreneurship because it is recognised as a force for good. How this "good" is achieved, indeed, determining what is "good" is the role of the policy maker. These "goods" or objectives are about creating value in one domain or another, and, as noted above, these can be very diverse. Therefore "value" covers both monetary and non-monetary returns. These values are, naturally, identified as objectives or targets by policy makers, who will then develop policies designed to achieve them. Some countries for example will focus on the contribution of entrepreneurship to economic growth. Other countries might instead focus on the contribution of entrepreneurship to solving environmental problems or its contribution to social inclusion."

In addition, the OECD authors explain that the definitions aim to associate entrepreneurship with the critical stages of creation and development of new economic activity, considering that many other indicators already exist to measure all other stages of business activity. In other words, once the business project is established, the entrepreneur turns into a manager. This explains the lesser weight of routine managerial aspects in the definitions.

Finally, failure is said to be part of the process: "(...) Many studies of entrepreneurship investigate and focus only on those entrepreneurs or entrepreneurial businesses that succeed. Failure is a very important part of the entrepreneurial process and much can be learned from understanding it. Entrepreneurs who failed were still entrepreneurial and, indeed, entrepreneurs."

1.2.3 *Towards a definition of digital entrepreneurship*

Taking into account the EIP definitions presented above, we propose the following definition of digital entrepreneurship:

²⁹ In 2013, the EIP issued again a unique broad-encompassing definition: "Entrepreneurship is defined by the EIP as the phenomenon associated with entrepreneurial activity, which is the enterprising human action in pursuit of the generation of value, through the creation or expansion of economic activity, by identifying and exploiting new products, processes or markets. In this sense, entrepreneurship is the phenomenon that manifests itself throughout the economy and in many different forms with many different outcomes, and these outcomes are not always related to the creation of financial wealth; for example, they may be related to increasing employment, tackling inequalities, or indeed, increasingly, environmental issues." (OECD, 2013, p.12)

- **Digital entrepreneurs** are those persons who seek to generate value, through the creation or expansion of economic activity, by identifying and exploiting new ICT or ICT-enabled products, processes and corresponding markets³⁰
- **Digital entrepreneurial activity** is the enterprising human action in pursuit of the generation of value, through the creation or expansion of economic activity, by identifying and exploiting new ICT or ICT-enabled products, processes and corresponding markets³¹
- **Digital entrepreneurship** is the phenomenon associated with digital entrepreneurial activity.

While the expressions 'ICT entrepreneurship' and 'digital entrepreneurship' are widely used, we have opted to use only the expression '**digital entrepreneurship**' in this report as we believe it better reflects the fact that entrepreneurship exists both within and outside the ICT sector.³²

- digital entrepreneurship *within the ICT sector*, defined as pursuit of the generation of value, through the creation or expansion of economic activity, by identifying and exploiting *new ICT* products, processes and markets
- digital entrepreneurship *outside the ICT sector*, defined as pursuit of the generation of value, through the creation or expansion of economic activity, by identifying and exploiting *new ICT-enabled* products, processes and markets.

The innovative dimension is seen here, largely if not solely, as ICT intensive, *characterised by the production or by the use of ICT*. The opportunities the entrepreneur will need to seek, the Schumpeterian combinations to create, and the business creation he/she will need to assume the responsibility and the risk for, are in:

- the production of new ICT or ICT-enabled products (goods or services),
- the implementation of new ICT-enabled processes,
- the access to new markets for ICT or ICT-enabled products (goods or services).³³

Technology therefore is seen as an essential component of the innovation, which together with the newness of the activity (the creation of a new business or of an in-house new business activity) compose the definition of digital entrepreneurial activity. Just as entrepreneurship is about innovation, digital entrepreneurship is about ICT innovation.³⁴

³⁰ This definition is strongly inspired by the definition developed in the joint OECD-EUROSTAT EIP project. Nevertheless, it might be useful to note that since, the notion of innovation has been extended to organisation and marketing innovation (See for example the CIS, 2012). Such extended definition might show highly relevant in the case of digital entrepreneurship.

³¹ Same remark as above about a possible extension of the definition for organisation and marketing innovation.

³² A possible alternative would have been to distinguish formally between "ICT entrepreneurship" *within* the ICT sector (sector taxonomy defined by the OECD), and "digital entrepreneurship" as encompassing all such activity *outside* the ICT sector. The option could even limit the use of ICT entrepreneurship to product innovation within the ICT sector. It is not the perspective taken in this report which, in addition, does not ambition to discuss such issues of taxonomy which are better assessed and decided within institutional contexts such as the OECD.

³³ Same remark as above about a possible extension of the definition for organisation and marketing innovation.

³⁴ Notably, a different research question would invite to investigate the impact of ICT on entrepreneurship in general, assuming that those technologies reduce the costs of experimenting and diversify opportunities. This could stimulate entrepreneurial activities in the ICT sector, but also in ICT using sectors. This research question is not debated in this report.

1.2.4 Two related issues³⁵

The above definition of digital entrepreneurship raises two issues, which this report is not intended to fully resolve. The following paragraphs frame some of the main aspects raised by these issues.

Is digital entrepreneurship different from entrepreneurship?

The definition of digital entrepreneurship introduces the implicit hypothesis that it is a special case, a particular subset of entrepreneurship in general. This assumption drives the whole report: the characteristics that define entrepreneurship, such as i.e. "the identification and assessment of opportunities, the decision to exploit them oneself or sell them, efforts to obtain resources and the development of the strategy and organization of the new business project " (See 1.2.2) will have a specific profile in the case of digital entrepreneurship. This assumption is also consistent with policies which aim to sustain a healthy business climate *specifically* for starting and growing digital entrepreneurial initiatives³⁶.

Still, in the absence of empirical data, this assumption can only be argued from a theoretical viewpoint. It still needs to be demonstrated. Also, prior to any empirical testing, it would be relevant to further distinguish the various cases of digital entrepreneurship that are currently aggregated under one definition: this would call for some – still non-existent – taxonomy.

The assumed difference is exemplified in the following statements, which apply to hi-tech firms and sectors³⁷: young companies in high-technology sectors *"are more likely than others to be pursuing opportunities associated with radical innovations that produce positive knowledge externalities and that may have transformative consequences for society (Baumol, Litan, and Schramm 2007). Because such opportunities are so challenging and so risky, existing businesses are particularly unlikely to find out about them or to pursue them (Utterback 1994, Christensen and Rosenbloom 1995). High-technology start-ups are one of the main organizational vehicles by which new knowledge in the science and engineering disciplines is converted into economic benefits (Acs, et al. 2005, Acs, Audretsch, and Strom 2009)."*³⁸ Digital entrepreneurship – if considered a hi-tech business – is expected to be different, to have specific characteristics, behaviours and outputs as a particular subset of entrepreneurship in general. The main reasons given for this difference rely on its technological features and their consequences.

The barriers and drivers to entrepreneurship are listed in the EIP framework.³⁹ The following list exemplifies assumptions regarding barriers and drivers to digital entrepreneurship, examples that occasionally offer some empirical indications⁴⁰:

³⁵ The author is grateful to numerous reviewers for their contribution to this discussion, in particular, P. Alajaasko, K. Giannakouris, G. Perani and A. Sabadash (Eurostat), V. Spiezia (OECD), O. Debande (EIB), D. Nepelski, F. Biagi and P. Desruelle (JRC-IPTS).

³⁶ In this domain, the US federal government has, since many years, made significant efforts (...) to stimulate entrepreneurship, especially in high-tech sectors. In particular, since 1982, a designated fraction of the federal budget across the major R&D agencies has been devoted to the Small Business Innovation Research (SBIR) program, which supports many innovative small companies (Wessner 2007). On this subject see IPTS report at: <http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=7241>. Also, a review of US states' initiatives in economic development shows that states seek to shift the basis of competitive advantage from cost reduction to knowledge creation, innovation, and entrepreneurship. (Adapted from Hart et al, 2009).

³⁷ Obviously, ICT industries are known as a major component among high-tech sectors, in value-added, employment, and more importantly in R&D intensity.

³⁸ Hart et al (2009), pp.11-12.

³⁹ Jointly created by the OECD and EUROSTAT. The inventory that follows is directly inspired by the EIP framework, described in Annex 1.1 (OECD, 2013).

⁴⁰ Some of the assumptions presented here are based on the qualitative case studies executed within the framework of the IPTS EURIPIDIS project. Such case studies, without claiming for generalisation, illustrate the variety and specificity of ICT innovation, and of the firms and entrepreneurs that manage them.

- Regulatory frameworks: The creation and positioning of an ICT innovation on the market is considerably affected by the legacy regulatory framework of each country. Anecdotal evidence abounds of how much these technology(-enabled) innovations challenge legal frameworks such as copyright, privacy, fiscal frameworks, competition regulations, etc. It is assumed that this is not the case, or at least less so, for traditional entrepreneurial activities.
- Market conditions: Digital entrepreneurial activities would pertain in some important cases, to the "star economy" where one takes all, largely due to network effects. First mover's advantage affects competition greatly. It is assumed that global-born digital platforms,⁴¹ for example, challenge anti-trust laws, competition laws, and rules for access to foreign markets. Standardisation processes also affect market conditions and the positioning of entrepreneurs.⁴²
- Access to finances: Financing of digital entrepreneurship seems to offer a contrasted profile, partly due to the high heterogeneity of entrepreneurial activities. Theoretically, the availability of ICT (in particular, access to internet) has lowered the financial barriers to entry for newcomers by lowering the need for initial capital. However, numerous recently created companies (<10 years) benefit from very high levels of market capitalisation and VC support, topping the companies of most other sectors⁴³, while the fast evolution of digital technologies raises the level of uncertainty of any venture. One can assume that this negatively affects access to financing, as most of the financial sector players are unprepared for a technology-based risk assessment.
- Entrepreneurial capabilities: Because the opportunities in high-tech sectors blend together technological and market factors, individual entrepreneurs and founding teams in these sectors are expected to combine technical expertise rooted in formal education with market savvy resulting from earlier and extensive business experience. (Hart et al, 2009)⁴⁴
- The relative role of educated foreign-born citizens might be worth analysing in the specific case of digital entrepreneurship. In the case of the USA, Hart et al. (2009) observe that 16% of the companies of their sample of hi-tech high-growth companies have at least one foreign-born founder⁴⁵
- Digital technologies have emerged since the late 80s, and the internet has been capturing shares of the economy since the early years of this century. This probably affects the demographic profile of the digital entrepreneur.⁴⁶
- Culture: Digital technologies and entrepreneurship may be very differently rooted today in the local culture in comparison to more traditional business creation. They may benefit from an aura of success. In addition, public authorities, at least in Europe, have been insisting for two decades on the unique benefits of going digital. The overall attitude of European populations may be much more positive towards digital entrepreneurship than entrepreneurship in general.

Available at: <http://is.jrc.ec.europa.eu/pages/ISG/EURIPIDIS/EURIPIDIS.index.html>. Hart et al, 2009 have also served as inspiration for this section, with occasional empirical results.

⁴¹ See forthcoming IPTS reports on the economics of platforms in the IPTS Digital Economy Series at: <http://is.jrc.ec.europa.eu/pages/ISG/DigEcoPapers.html>

⁴² See forthcoming IPTS reports on the role of ICT patents and standards at: <http://is.jrc.ec.europa.eu/pages/ISG/EURIPIDIS/EURIPIDIS.index.html> (in the series of the IPTS EURIPIDIS project).

⁴³ See forthcoming IPTS report "How to catch a Unicorn" (in the series of the IPTS EURIPIDIS project).

⁴⁴ This statement of Hart et al (2009) finds some qualitative confirmation in several IPTS reports on Models of Innovation. See at : <http://is.jrc.ec.europa.eu/pages/ISG/EURIPIDIS/EURIPIDIS.index.html>

⁴⁵ Linking the nationality of origin to specific assets, Hart makes interesting hypothesis which, if proven true would show rather favourable in the by-nature multicultural universe of the European Union.

⁴⁶ Typically, the image of the "geek" still haunts the corridors of digital entrepreneurship, in particular in the media. It is probably a highly mistaken perspective. See for more in the forthcoming report of IPTS: "How to catch a Unicorn".

Regarding performance, it is expected that digital entrepreneurship will show positive differences when it comes to measuring business demographics such as birth rates, death rates, churn, net population growth, survival rates, share of high-growth (young) companies, etc. Available business demographic data show that these expectations are already true for the ICT sector⁴⁷ in general, and indirectly for ICT-using industries⁴⁸. Consequently, it is also assumed that digital entrepreneurship contributes to a major share of job creation and economic growth.

More analysis would be welcome to further confirm the general hypothesis that digital entrepreneurship is a major engine of creative destruction in advanced economies, building their competitiveness through knowledge intensity rather than cost reduction.⁴⁹

This section started with a blunt question: Is digital entrepreneurship different? Theoretical views and available empirical results claim this hypothesis may be true: digital entrepreneurship is indeed expected to be different from entrepreneurship in general.

However, the expected performance and impacts are assumptions that would need to be seriously tested and linked to the framework conditions (barriers and drivers). This rapid overview demonstrates the need for further empirical observation. The absence of data systematically targeting digital entrepreneurship leaves most of the above statements open to debate.

What is ICT (enabled-) innovation?

The definition of digital entrepreneurship raises a second issue as it requires the formulation of a definition of ICT-enabled innovation itself. Or at least, an operational definition should be found that permits empirical observation and measurement. This definition does not exist currently.⁵⁰

When considering the issue of ICT innovation in the ICT sector (as defined by OECD, 2011),⁵¹ it is plausible to conclude that *any innovation* – product, service or process – developed, implemented and/or marketed by the ICT sector can be considered to be an ICT innovation. And any related entrepreneurial activity, can be considered to be digital entrepreneurship.

The issue is far less evident when it comes to ICT-enabled innovation, seen as innovation with an *essential ICT component* that has been developed, implemented and/or marketed by a sector other than the ICT one.

First of all, ICT are everywhere. Being a general purpose technology, ICT technologies are ubiquitous by definition, and hence present across the whole economy. In advanced economies, ICT will probably be observable everywhere, in any economic activity, and often be measured in terms of access.⁵² According to this line of analysis, it makes as little sense to speak of ICT-enabled innovation as it would to speak of electricity-enabled innovation. Seen as such, any entrepreneurial activity ends up as digital and it becomes impossible to differentiate it in any way.

⁴⁷ See for example Gabison G., 2015. Birth, Survival, Growth and Death of ICT Companies at <https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/birth-survival-growth-and-death-ict-companies>.

⁴⁸ For both demographic aspects see OECD, 2014. Measuring the Digital Economy. A new perspective. In particular see data on pp. 109, 113 and 131.

⁴⁹ See for example: Bartelsman, E.J. Haltiwanger, J. and Scarpetta, S., Microeconomic Evidence of Creative Destruction in Industrial and Developing Countries (October 2004). IZA Discussion Paper No. 1374; Tinbergen Institute Discussion Papers No. TI 2004-114/3; World Bank Policy Research Paper No. 3464. Available at SSRN: <http://ssrn.com/abstract=612230>; or more recent: Bartelsman E.J. (2013). ICT, Reallocation and Productivity. (DG ECFIN), European Commission.

⁵⁰ See for example Oslo Manual at <http://ec.europa.eu/eurostat/ramon/statmanuals/files/9205111E.pdf>, or the Science and Technology Glossary of Eurostat at <http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary>

⁵¹ See at <http://www.oecd.org/sti/ieconomy/oecdguidetomeasuringtheinformationsociety2011.htm>

⁵² For such approach, at country level, see ITU index of ICT intensity.

Second, ideally speaking, digital entrepreneurship or digital economy should be about how ICT have changed the nature of the economic activity, how digitalisation has transformed an existing activity into another. Measuring the ICT-enabled innovation should consist of measuring the transformation of the activity, the step change and its size. When, as is usual, the observation starts proxying this digital shift with the importance of investments in ICT (how much ICT?), or with the type of ICT used (which ICT?), it probably misses the point.

Thirdly, some lessons can probably be learned from a similar debate, about the intensity of ICT use (See box).

These academic debates about ICT use intensity⁵³ show the complexity defining, observing and measuring it: the task seems impossible in a fast moving technological environment where traditional data collection often has long time lags and legitimate but disturbing disruptions.

However, some lessons can be learned. First, the acknowledgement, and hypothetical measurement, of ICT-enabled innovative entrepreneurship activity will probably need to be established at firm-level. There is little, or no sense in measuring ICT-enabled innovative entrepreneurship at sector level, though there is in measuring ICT use intensity.

Second, at firm level, past approaches favoured – for pragmatic reasons of data availability – a technology-driven assessment of innovation (which ICT is used?) over an approach focusing on the outcome. In practice, the use of pre-determined ICT, often seen as "novel", is considered as a measurement of ICT intensity. Experience has shown that this technology-driven approach needs to take into account a rapidly changing technological environment.

Last but not least, many of the surveys at firm-level are based on a subjective appreciation of facts by interviewees, when for example the surveyed firms (or entrepreneurs) are asked directly for an assessment, rather than for observable evidence. This approach has the advantage of providing direct information, but is usually considered less objective than empirical measurement techniques. Also, questions in surveys usually collect yes/no responses (important / not important) or a choice on a scale.

These elements give us some indication of how to capture ICT-enabled innovation. In all cases, the available methods seem to favour the collection of data and assessments about proxies, in the absence of a clearer capacity for observing the phenomenon at hand.

Several surveys investigated later in this report do use these methods. For example, the Global Entrepreneurship Monitor (GEM) has been designated by this report as a fair candidate for improving the current empirical knowledge base about digital entrepreneurship. Several surveys also adopt the technology-driven assessment of ICT-enabled innovation, for example the Digital Entrepreneurship Monitor (DEM).

These few indicative lessons and examples show us that operational approaches to identifying ICT-enabled innovation are still far from offering optimal measurement of a digital shift. Unfortunately, this is an unresolved issue that we will provisionally term: the "ICT intensity of innovation".

⁵³ More recently, estimates of ICT intensity per sector have been approached through an assessment of ICT-related employment. While promising, those approaches are still under development and raise numerous issues.

Intensity of ICT use by sectors and firms

For a long time, the notion of ICT intensity has been debated in academic circles, when to the aim was to understand and measure the economic impacts of ICT use across the economy. Which sectors have "High ICT intensity" profiles, and to what extent does ICT intensity explain high productivity growth?

The definition has varied with time and schools of thought. The most relevant and acknowledged view of ICT intensity was developed in the World KLEMS initiative, established at Harvard University and completed by van Ark et al.⁵⁴ for the EU. This landmark study provides industry-level accounts based on the methodology of Jorgenson, Ho, and Stiroh (2005) and roots itself in the measurement of gross fixed capital, distinguishing ICT and non-ICT capital in the production function. This strand of literature has generated a plethora of essential results. It raises the question of whether a similar methodology, applied by analogy, could serve to capture ICT-enabled innovation, its intensity and its impact. Current measurement efforts on private and public intangibles can be seen as complementary follow-ups developing industry-level estimates of private⁵⁵ and more recently of public intangible ones⁵⁶.

Other researchers have tried to offer definitions and measurements of ICT intensity using firm-level data. "Over the past decade, analysis of the impact of ICT use has also benefited from the establishment of longitudinal databases in statistical offices. These databases allow firms to be tracked over time and may contain information from several surveys and data sources. They typically cover large and statistically representative samples of firms, which is important given the enormous heterogeneity in firm characteristics and performance (Bartelsman and Doms, 2000)."⁵⁷ In particular, the EssNet project dedicated to Linking of Microdata to Analyse ICT Impact⁵⁸ offers a discussion and new ways of measuring the intensity of ICT usage by firms, which might be revealing for the definition and measurement of ICT-enabled innovation. "Work within the ICT Impacts and ESSLimit project has revealed that the life time of different ICT indicators vary, and when a certain ICT tool comes closer to saturation it might lose its importance as driver of firm performance. Because of this, not only new ways of categorising firms (are) needed but also an indicator that would be able to deal with the constantly changing nature of ICT usage. (...) An important extension (of the project) is this inclusion of a new, yet experimental, firm-level ICT indicator, which we call ICT Intensity (ICTi). Based on the observation that individual ICT indicators rapidly achieve saturation, we defined a composite indicator where new forms of ICT usage could be added, and other could be dropped as they reach saturation. For this indicator, separate discrete choice models were estimated for different ICT variables (Enterprise Resource Planning (ERP), Customer Relation Management (CRM), Supply Chain Management (SCM), and Automated Data Exchange (ADE)). In short, the idea is that from the discrete choice model estimations, propensities for the adoption of each of the ICT systems can be calculated. As the value of adoption increases with the existing ICT intensity in a firm, the propensities are correlated with the ICT utilisation and can therefore be seen as proxies for ICT intensity. Our indicator combines the individual propensities by ICT variable into one (firm-level) indicator of ICT intensity, by taking a (equally weighted) geometric mean of the four underlying propensities. This allows the categorization of firms as ICT-intensive or not, beyond for example, their industry.

Moreover, it is possible to add and remove new technologies from the definition of this indicator, in line with technological progress. Other indicators, like the number of PCs or internet access, lose their usefulness for international benchmarking as the adoption of the corresponding technology reaches a level of saturation."⁵⁹ Even more recently, estimates of ICT intensity by sector have been attempted, in particular at the JRC-IPTS through an assessment of ICT-related employment. These methods, though promising are still under development and raise various issues.⁶⁰

⁵⁴ Marcel P. Timmer, Robert Inklaar, Mary O'Mahony, and Bart van Ark (2010).

1.3. Conclusions

In this chapter, rooted in the Schumpeterian theory of creative destruction, we have presented the clear and consensual OECD/EUROSTAT definition of entrepreneurship, as developed throughout the Entrepreneurship Indicators Programme (EIP).

This EIP definition focuses on the innovative and value creation aspects of entrepreneurship, while explicitly allowing entrepreneurial activity to be observed in both small new companies as well as established large corporations. This definition can be extended to include digital entrepreneurship.

The definition proposed in this report for digital entrepreneurship is inspired by the EIP definition. In addition, it makes it more specific by dedicating a central role to ICT technology in innovation. It also acknowledges and encompasses the innovative production *and* use of ICT both within *and* outside the technological sector itself.

Nevertheless, this definition leaves us with two unresolved issues:

- First, it relies on an assumption: it differentiates digital entrepreneurship from entrepreneurship in general, and claims it is worth a dedicated analysis of its specific barriers and drivers.
- Second, it raises a conceptual and methodological issue: formulating a definition of ICT-enabled innovation and establishing an observation and/or measurement method of the digital shift, sufficiently robust to sustain the criteria of relevance and validity across time.

Borrowing from the OECD (2011), it is fair to conclude that *"there are several key issues that remain poorly analysed and that offer scope for progress. For example, further work with firm-level data could provide greater insights into (...) the role of new firms, the conditions that lead to successful survival and the factors determining firm exit. Moreover, the link between innovation and ICT has only been examined for some OECD countries."* Since that statement, not much progress has been observed.

The next chapter explores the main challenges raised by the proposed definition of digital entrepreneurship and how the current measurement frameworks of entrepreneurship address, or not, these challenges and consequently any project of empirical measurement or analysis of digital entrepreneurship.

⁵⁵ INTAN INVEST project: <http://www.intan-invest.net/>. INTAN-Invest estimates are the elaboration of work previously conducted under three projects: two funded by the European Commission 7th Framework Programme (COINVEST, which ran from 1 April 2008 to 30 September 2010, and INNODRIVE, which ran from 1 March 2008 to 1 April 2011) and an ongoing effort of The Conference Board (See at <http://www.conference-board.org/data/intangibles/>).

⁵⁶ SPINTAN project (European Commission 7th Framework Programme): <http://www.spintan.net/>

⁵⁷ From: OECD (2011), *OECD Guide to Measuring the Information Society 2011*, OECD Publishing. <http://dx.doi.org/10.1787/10.1787/9789264113541-en>. p.80.

⁵⁸ EssNet: The MEETS programme (Modernisation of European Enterprise and Trade Statistics) ran over a period of five years from 2009 to 2013. Grants to collaborative networks of National Statistical Institutes as members of the European Statistical System Network (ESSnet projects) were the most important administrative and financing instrument of the programme. Reports of the successive EssLimit and EssLait projects can be accessed from: <http://www.cros-portal.eu/content/finished-projects>

⁵⁹ Extract from: Bartelsman E., Polder M. (2012). A new, experimental ICT intensity indicator. In: ESSnet on Linking of Microdata on ICT Usage. Final report. Eurostat Grant Agreement 50701.2010.001-2010.578

⁶⁰ See forthcoming IPTS reports on the ICT intensity per sector in the PREDICT Series at: <http://is.jrc.ec.europa.eu/pages/ISG/DigEcoPapers.html>

2 Towards a measurement of digital entrepreneurship

"For a field of social science to have [some political] usefulness, it must have a conceptual framework that explains and predicts a set of empirical phenomena not explained or predicted by conceptual frameworks already in existence in other fields. To date, the phenomenon of entrepreneurship has lacked such a conceptual framework" (Shane S., Venkataraman S., 2000).

Broadly speaking, since this statement of Shane and Venkataraman, entrepreneurship as a concept and a subject for empirical testing has further irrupted and developed in the policy arena. Unfortunately, from a scientific point of view, it has not proved to progress as much as needed since Schumpeter first statements. This lack of progress affects today the analysis of digital entrepreneurship.

2.1 Assessing the relevance of current definitions for digital entrepreneurship

Notwithstanding the OECD/EUROSTAT efforts with the EIP project,⁶¹ there is no consensual definition of entrepreneurship or entrepreneurs in the literature, and this affects the later identification of the relevant units of analysis and their measurement.

Each successive definition focuses on specific assumptions or reversely intents to be all-encompassing at risk of being purposeless and difficult to operationalize.

In 2008, the OECD admitted that: *"even the OECD itself has contributed to the confusion since virtually every study that has focussed on entrepreneurship has presented a different definition of the term. For example, in an OECD Economic Survey in 1997, it was defined as "the dynamic process of identifying economic opportunities and acting upon them by developing, producing and selling goods and services". In "Fostering Entrepreneurship", it was defined as "...the ability to marshal resources to seize new business opportunities...". In a 2001 publication on Youth Entrepreneurship, the term was equated with self-employment: "... an entrepreneur is anyone who works for himself or herself but not for someone else...". Finally, another 2001 publication entitled Drivers of Growth, referred to, "The concept of entrepreneurship generally refers to enterprising individuals who display the readiness to take risks with new or innovative ideas to generate new products or services."*⁶²

In addition, Shane and Venkataraman (2000), in their review of literature, criticise the fact that most researchers have defined the field solely in terms of who the entrepreneur is and what he or she does. For the authors, such definitions miss the fundamental aspects of the variation in quality of the opportunities, and focus the research on hypothetical individual attribute

2.1.1 Main limitations of the definitions of entrepreneurship

The most substantial and debatable limitations of the current definitions of entrepreneurship are the following:

1. The definition encompasses explicitly – or not - the notion of innovation, at risk of equating entrepreneurship with the creation and management of any new business project. In such case, the definition gives a pre-eminence to the routine managerial activities of running a (new) business and tends to disregard the entrepreneur's exploratory activities of opportunities seeking and discovery, as well as the combination activities related to innovation in goods, process or market.

⁶¹ Described in Points 1.2 and 2.1.

⁶² In: Ahmad N., Seymour R.G., 2008.

2. The definition indicates – or not - the technological dimension of the innovation. This feature, unnecessary probably when speaking of entrepreneurship in general⁶³, becomes substantial when it comes to digital entrepreneurship.
3. The definition assimilates entrepreneurship solely – or not – to the creation of a new firm. Such definitions exclude the cases of entrepreneurial activity within an existing firm.

For the purpose of this report, those three distinctions about entrepreneurship - Innovation, the absence of the technological dimension (i.e. ICT) and the exclusion of in-house entrepreneurial activity are seen as substantial to the analysis of entrepreneurship in general and of digital entrepreneurship in particular. They strongly affect the population of firms under observation. They are also substantial to policy making as they affect the target population, hence the policy-relevant factors as well as the economic outcome.

The report details further those three substantial and debatable points below.

Second, less substantial to the purpose of analysing digital entrepreneurship, some definitions (or the comments that accompany them) establish characteristics that focus the interest on a subset of the total population under observation by imposing the criteria of ownership, by the entrepreneur, of the newly created firm, or the self-employment status of the entrepreneur, or the creation of employment by the firm.

For example, In the NBER⁶⁴ series on entrepreneurship,⁶⁵ Mondragón-Vélez C., Peña X. (2010) show that many authors, in their definitions, equal entrepreneurship to firm ownership, while others focus even more specifically on self-employment. The focus is justified, in those studies, by the fact that the authors know and demonstrate that such aspects impact differently the economic analysis in different countries, due to their national economic structure. This is particularly true for developing economies. Still, those definitions narrow down the domain initially defined by the NBER as the new enterprises fomenting innovation. Similarly, the Entrepreneurship Indicators Programme of the OECD/EUROSTAT does not consider all active firms but focuses on employer enterprises, hence excluding all self-employed individuals/teams who do not hire others.⁶⁶ This has been done because it allows for a better comparison of the entrepreneurship indicators across countries. However, it may miss out on the importance of many new and innovative ventures by individuals who do not aim at creating employment in their own business but may have impacts on employment in other businesses. Elsewhere, the Global Entrepreneurship Monitor data does not track down individuals involved as owner-managers in several businesses. All such projects will be investigated below.

⁶³ The report shows later that technology is present, in various instances, in the measurement efforts.

⁶⁴ Founded in 1920, the National Bureau of Economic Research is an American private, non-profit research organization dedicated to promoting a greater understanding of how the economy works. More at: <http://www.nber.org/info.html>

⁶⁵ The NBER has taken up the issue of Entrepreneurship since 1993. It aims to study the role of new enterprises in fomenting innovation, stimulating employment, and creating value for investors. For the purpose of the analysis, the authors define entrepreneurship as "the activities of an individual or a group aimed at initiating economic activities in the formal sector under a legal form of business." (Klapper L. et al., 2010).

⁶⁶ About this aspect, the OECD authors explain: "In offering these definitions, we realise that they cover only a subset of entrepreneurial activities, as they focus on business owners. The focus on business-related entrepreneurship does not imply that other forms of entrepreneurship are unimportant. It simply reflects a conscious decision to orient the definition towards the economic policy interests of OECD, EU and other countries." Ahmad N., Seymour R.G., 2008, p.10.

This is to say that the details of the definitions and the subsequent establishment of each indicator and mode of collection need always to be thoroughly understood⁶⁷ in particular in case of comparison or aggregation of data from different sources.

Third, and probably even less immediately relevant for the purpose of this report, some definitions, as the EIP one, introduce distinctions in the value created (economic vs non-economic). When broadening entrepreneurship to non-economic value creation activities, those definitions open broadly the field of entrepreneurship and innovation, integrating hence Social entrepreneurship (and Social innovation) as an additional field for research.⁶⁸

The next sections further detail those three most substantial limitations.

2.1.2 About innovation as a core feature of entrepreneurship

Many authors observe that the words of entrepreneur and manager are used interchangeably, while innovation is the concept that marks the difference.

Sousa (2010) claims that in economic literature, there are two meanings associated with entrepreneurship. The author offers to distinguish between *"(1) entrepreneurship as a disruptive process that acts as the engine of economic growth – a functional concept; and (2) entrepreneurship equated to (small) business ownership – an occupational concept."*

Further she states: *"The functional concept of entrepreneurship (...) conceives entrepreneurship as a disruptive process embedded in markets functioning that constitutes the engine of economic growth (Douhan et al. 2007, Gunning 1997). From this perspective, the entrepreneur is someone who:*

- 1. has the capacity to envisage opportunities because of his superior alertness (Kirzner 1973);*
- 2. is willing to take risks (Knight 1921);*
- 3. is innovative and creative in exploiting the opportunities (Schumpeter 1934), and*
- 4. introduces successful innovations or "new combinations" into the markets. These include new ideas, new ways of acting, new markets, new goods/services, new production techniques, new supply sources, or new organizational methods.*

Entrepreneurship is the engine of economic growth because the introduction of successful "new combinations" disrupts the existing market equilibrium and boosts productivity, which, in turn, fuels economic growth."

Similarly, in the Entrepreneurship Indicators Programme (EIP) work, Ahmad and Hofmann (2007), already state: "(T)here is something different about entrepreneurial businesses that sets them apart from other businesses; namely they are in the business of doing something new, whether that be by creating/ identifying new processes, products or markets. Not all businesses are entrepreneurial, indeed not even all new businesses are necessarily entrepreneurial".

Entrepreneurship is believed to be (much) more than the management of a newly created firm.

Similarly in 2008, in the framework of the Entrepreneurship Indicators Programme (EIP) project, the OECD states: "(...) there is no particular vehicle" that is required for entrepreneurial activity to be "undertaken". In developing economies, it may be appropriate for researchers to measure the number or rate of firms entering the formal

⁶⁷ Bosma et al., (2012), pp.92-93 explains the procedure that has been followed to match GEM-based statistics to the Eurostat-OECD EIP statistics and the Eurostat business demography statistics as closely as possible.

⁶⁸ On these topics, see JRC-IPTS EURIPIDIS current and forthcoming reports at <http://is.jrc.ec.europa.eu/pages/ISG/EURIPIDIS/EURIPIDIS.index.html>

economy, however for developed economies, an entrepreneur may utilise either an incorporated entity, partnership, or operate as a sole trader as the entrepreneurial vehicle. It may well be that the establishment of new firms can be an important indicator of entrepreneurial performance, however it is not in itself entrepreneurial.⁶⁹

Curiously, the complementarity of on one hand innovation through the identification and the creation of risk taking conjectures and activities, with on the other hand business-oriented drive and managerial competencies send us back again to the early 17th-18th century debates about the entrepreneur: "Credit for coining the term entrepreneur generally goes to the French economist Jean-Baptiste Say (1767-1832), but in fact the Irish-French economist Richard Cantillon (1680-1734) defined it first (...). Cantillon used the term differently, however. Cantillon biographer Anthony Breer notes that Cantillon saw the entrepreneur as a risk-taker while Say considered the entrepreneur a planner."⁷⁰

In the words of Venkataran (1997, pp.120-121), another theoretician of entrepreneurship: "Entrepreneurship as a scholarly field seeks to understand how opportunities to bring into existence 'future' goods and services are discovered, created, and exploited, by whom, and with what consequence". Venkataran's approach is indeed an approach focused on innovation, undoubtedly borrowing upon Schumpeter's views. It excludes entrepreneurship that would consider the only creation of small businesses (with no novelty, other than the firm creation itself).

The entrepreneurial versus the managerial function

It is necessary (...) to differentiate between the entrepreneurial and the managerial functions.

We may define the manager to be the individual who oversees the ongoing efficiency of continuing processes. It is his task to see that available processes and techniques are combined in proportions appropriate for current output levels and for the future outputs that are already in prospect. He sees to it that inputs are not wasted, that schedules and contracts are met, he makes routine pricing and advertising outlay decisions, etc., etc. In sum, he takes charge of the activities and decisions encompassed in our traditional models.

(...) The entrepreneur (whether or not he in fact also doubles as a manager) has a different function. It is his job to locate new ideas and to put them into effect. He must lead, perhaps even inspire; he cannot allow things to get into a rut and for him today's practice is never good enough for tomorrow. In short, he is the Schumpeterian innovator and some more. He is the individual who exercises what in the business literature is called "leadership." And it is he who is virtually absent from the received theory of the firm.

Source: Baumol, 1968, pp.64-65

Consistent with the above, there has been for long a fusion – and confusion – between two concepts and two ways of identifying the scientific and political domain: Entrepreneurship or Small Businesses (SMEs). And such confusion has deeply affected evidence gathering and analysis. As stated by the OECD (2011): "*The pursuit and development of (...) policies (focused on the entrepreneurial environment) have until recently been hampered by the limited, albeit growing, empirical information relating to the factors that affect entrepreneurship and the benefits of it. Policy references to entrepreneurship were typically equated with small and medium sized enterprises (SMEs) in general or even numbers of self-employed. Neither of which fully captures the totality and complexity of entrepreneurship.*" (OECD, 2011)

⁶⁹ Ahmad, N. and R. G. Seymour (2008).

⁷⁰ From Wikipedia: http://en.wikipedia.org/wiki/Jean-Baptiste_Say

Hurst E., Pugsley B.W. (2011) observe that most small business owners are very different from the innovative entrepreneurs that economic models and policy makers often have in mind. Few small businesses intend to bring a new idea to market. Instead, most intend to provide an existing service to an existing market. Further, most small businesses have little desire to grow big or to innovate in any observable way. If this observation is to be true, the Schumpeterian entrepreneurship engine of innovation and growth is not the rule. It is the exceptional behaviour in the economy, one that may, or may not, make the difference.

Bosma et al. (2012) help understanding the issues at stake: The definition of entrepreneurship calls for *"an understanding of how economies change as they develop, and the changing nature and contribution of entrepreneurship in this development. For factor-driven economies, economic development is primarily driven by basic requirements: development of institutions, infrastructure, macroeconomic stability and health and primary education. In efficiency-driven economies, government focus is (or should be) on ensuring smooth mechanisms such as a proper functioning of the market; higher education systems, goods and labour markets and technological readiness. Even though these conditions are not directly related to entrepreneurship in the Schumpeterian sense of "creative destruction", they are indirectly related since the development of markets will also attract and enable more entrepreneurship. Finally, for countries whose economic development is primarily innovation-driven, entrepreneurial framework conditions become more important as levers of economic development than basic requirements or efficiency enhancers. The outcome of the model is national economic growth through, as an example, job creation and technical innovation."* Such view underlines why innovation is such an important facet of entrepreneurship in our economies as well as a prominent aspect of EU growth policies.

Today, putting innovation and its impacts, at the core - is central to the European policy purpose. As again expressed in OECD (1998): *"(...) a country with a lot of entrepreneurial activity is likely to be constantly generating new or improved products and services."* (OECD, 1998, p.12). Entrepreneurship is about novelty. Entrepreneurship is about innovation.

2.1.3 About technology (ICT) as the absent core feature

Few of the available definitions of entrepreneurship from literature integrate a technological dimension. Innovation is not associated to technology-enabled innovation, or innovative technology itself. This missing feature induces that little or no earlier effort has addressed specifically the issue of technology-enabled entrepreneurship or anything close to ICT-related innovation as substantial feature of digital entrepreneurship.

Rather, the current absence of a consensual definition of digital entrepreneurship tends to favour empirical observations that allow isolating only sectorial activity, hence – at best - the ICT sector. This focus misses the most important characteristic of ICT, as a general purpose technology (GPT), and hence its expected impact on the whole of the economy.

"A general purpose technology or GPT is a term coined to describe a new method of producing and inventing that is important enough to have a protracted aggregate impact.(...) Bresnahan and Trajtenberg (1996) argue that a GPT should have the following three characteristics:

- 1. Pervasiveness – The GPT should spread to most sectors.*
- 2. Improvement – The GPT should get better over time and, hence, should keep lowering the costs of its users.*

3. Innovation spawning – The GPT should make it easier to invent and produce new products or processes." (Jovanovic B. Rousseau P.L., 2005)⁷¹

Since several decades, many authors have discussed and shown that ICT meet one or several of the above characteristics and participate as GPT to productivity and growth.⁷²

Therefore, the definitions already proposed (Part I, Point 1.2.3) for digital entrepreneurship are meant to explicitly to offer a framework that captures ICT-related innovation within a GPT perspective.

The innovative dimension is at the core of these definitions. And innovation is seen as technology intensive or at least technology-enabled. It is largely, if not solely, seen as driven by the production or the use of ICT for innovative products, processes or markets. The opportunities the entrepreneur will need to see and the business creation he/she will need to take responsibility and risk for, are in the production and/or use of new ICT or ICT-enabled products, processes or markets.

Such perspective imposes of course to assume that digital entrepreneurship is different in essence from entrepreneurship in general⁷³. Expressed in such way, the assumption seems realistic. Literature on technology and business cycles, business demographics, skills, employment or productivity growth abound. Still, the absence of empirical data about digital entrepreneurship has made it this far impossible to test in a robust way that it is and would behave differently from entrepreneurship in general.

2.1.4 About in-house entrepreneurial activity as an additional object of observation

Schumpeter (1942, p.83) argued that "creative destruction is the essential fact about capitalism" and that the entrepreneur is the prime agent of economic change. This ability to break with established practice was linked primarily to individual entrepreneurs. (...). But later as he observed the increasing dominance of large corporations in industrial society, Schumpeter's view of entrepreneurship gradually changed—from entrepreneurship as the achievement of a single individual to innovative activities in existing organizations (Schumpeter 1942)." (Carlsson et al, 2013, pp.6-7)

Existing companies can be entrepreneurial, without hosting "entrepreneurs". Employees can also be entrepreneurial within existing companies.

⁷¹ The author continues: (...) this list can be expanded to include more subtle features of GPTs (...) as suggested by various theoretical models that deal with GPTs. These models predict the following symptoms:

Productivity should slow down – The new technology may not be user-friendly at first, and output may fall for a while as the economy adjusts.

The skill premium should rise – If the GPT is not user-friendly at first, skilled people will be in greater demand when the new technology arrives and their earnings should rise compared to those of the unskilled.

Entry, exit and mergers should rise – These are alternative modes for the reallocation of assets.

Stock prices should initially fall – The value of old capital should fall. How fast it falls depends on the way that the market learns of the GPT's arrival.

Young and small firms should do better – The ideas and products associated with the GPT will often be brought to market by new firms. The market share and market value of young firms should therefore rise relative to old firms.

Interest rates and the trade deficit – The rise in desired consumption relative to output should cause interest rates to rise or the trade balance to worsen".

⁷² Typically, see discussions about ICT, productivity and growth of E.Brynjolfsson, A. Colecchia, P. Schreyer, B. Van Ark, R. Inklaar, M. O'Mahony, D. Pilat, etc.

⁷³ Confronted to this same question, the Digital Entrepreneurship Monitor team concluded rather on the similarities of Digital entrepreneurship with entrepreneurship in general. The experts review did not really find any clear material that would distinguish the two.

Intrapreneurship?

The first formal academic case study of corporate entrepreneurship or intrapreneurship was published in June 1982, as a Master's in Management thesis, by Howard Edward Haller, on the intrapreneurial creation of PR1ME Leasing within PR1ME Computer Inc. (from 1977 to 1981). (...)

The American Heritage Dictionary of the English Language included the term 'intrapreneur' in its 3rd 1992 Edition, and also credited Gifford Pinchot III as the originator of the concept.

The term "intrapreneurship" was used in the popular media first in February 1985 by *TIME* magazine article "Here come the Intrapreneurs" and then the same year in another major popular publication was in a quote by Steve Jobs, Apple Computer's Chairman, in an interview in the September 1985 *Newsweek* article, where he shared, "The Macintosh team was what is commonly known as intrapreneurship; only a few years before the term was coined—a group of people going, in essence, back to the garage, but in a large company."

Source: Wikipedia

Intrapreneurship is a word coined in the 80s, even though earlier experiments had already developed in the 40s of the last century. Such activities will be equally called "corporate entrepreneurship" or "corporate venturing". There are still opposing views about the meaning of this term, considering on one hand employee initiatives in organizations undertaking something new, without being asked to do so, and on the other hand, formal managerial styles and tools incentivising the search for innovation within the firm.⁷⁴ In such cases, the firms or the employees are both called "entrepreneurial".⁷⁵

Bosma et al. (2013) propose: "corporate entrepreneurship includes corporate venturing and strategic renewal (Guth and Ginsberg, 1990; Sharma and Chrisman, 1999).

Corporate venturing is the generation of new business initiatives (Miles and Covin, 2002; Covin and Miles, 2007). It is therefore a process of seeking new opportunities to extend the scope of activities of the company to related or partially related areas, leading to the development of new products, markets and/or technologies. Corporate venturing may take two forms (Sharma and Chrisman, 1999): (1) Internal venturing refers to new projects arising from within the company and resulting in the creation of organizational entities that reside within the existing organization; (2) External venturing refers to new projects resulting in the creation of (semi-)autonomous organizational entities that reside outside the existing organization. (...)

The second type of corporate entrepreneurship encompasses strategic renewal activities, also involving a new combination of resources and a profound transformation of the foundations of the company, that make a renewed company significantly different from what it was before (Guth and Ginsberg, 1990). Strategic renewal often involves redefining the mission of the company, the construction of a new business model, the reformulation of competitive strategic bases, and the acquisition or generation of new skills. The success of this process will largely depend on 'entrepreneurial drive' similar to that observed in the processes of business creation, with the existence of an entrepreneurial leader with a commitment and motivation, attitudes and behaviours similar to those of independent entrepreneurs (Dess et al., 2003; Jones 2005).

Compared with strategic renewal, corporate venturing is probably more related to the concept of intrapreneurship. The term 'intrapreneurship' is usually attributed to Pinchot (1985). This concept relates to bottom-up, proactive initiatives of individual employees.

⁷⁴ 3M, Intel or Google are often cited examples of companies explicitly managing intrapreneurship.

⁷⁵ For a conceptual discussion, see: de Jong J., Wennekers S. (2008).

In whatever ways corporate entrepreneurship and intrapreneurship are viewed, they always highlight the role of intentions, drives and activities of individual employees at various levels of the business hierarchy."

Notwithstanding those disagreements about the exact meaning of intrapreneurship, it is important to note that the above proposed definitions of digital entrepreneurship, inspired by the Entrepreneurship Indicators Programme (EIP) ones, do integrate in-house entrepreneurial activity, and even more so as the transformative capacity of ICT affects directly the existing firms. In the EIP definition, this is marked by the expression "expansion of economic activity".

Taking in account the divergent views about the meaning of each term, the report opts for a neutral wording: In-House Entrepreneurial Activity (IhEA).

As stated at the beginning of this section, the most substantial limitations of current definitions are the following:

1. The definition encompasses explicitly – or not - the notion of innovation.
2. The definition indicates – or not - the technological dimension of the innovation.
3. The definition assimilates entrepreneurship solely – or not – to the creation of a new firm.

For the purpose of this report, those three distinctions are seen as substantial to the analysis of entrepreneurship in general and of digital entrepreneurship in particular.

In the next sections, the report investigates how those three substantial differences are reflected in relevant measurement frameworks usually utilised to develop empirical analysis about entrepreneurship.

2.2 Assessing the relevance of the existing measurement frameworks for digital entrepreneurship

Many measurement frameworks exist to gather empirical quantitative data about entrepreneurship, its conditions of emergence, the measurement of the phenomena itself and its social or economic consequences. Measurement is a necessary step towards better founded evidence for policy support.

EUROSTAT presents measuring entrepreneurship as a three-pronged approach:⁷⁶

- **"Determinants"** - entrepreneurial activity is likely, at least in part, to be self-fuelling, i.e. increased GDP means more money and thus easier access to finance for new businesses, while success stories encourage other potential entrepreneurs to convert their ideas into a real business. However, there may also be negative correlations (push factors), i.e. more people (thinking of) setting up their own business in times of economic hardship, e.g. high unemployment.
- **Performance** – may, at least in part, be linked to the underlying business environment, conditioned by many economic, environmental and sociological factors, as well as the attributes of individual entrepreneurs. The indicators designed to measure performance comprise a basket of variables that generally reflect entrepreneurship, some of which have been collected for several years, while others will require new data collection exercises.
- **Impact** - can be measured not just in monetary terms, but via a range of variables, e.g. GDP growth, employment creation, income distribution."

⁷⁶ See at: http://epp.eurostat.ec.europa.eu/statistics_explained/index.php?title=Entrepreneurship_indicators&oldid=182674

Twelve measurement frameworks for entrepreneurship are investigated here. They have been selected for their reputation, robustness, steadiness in time and broad geographical coverage. This first set of twelve frameworks is targeting entrepreneurship at large. It is usually founded on a clearly expressed (academic) background and hence feeds with observations an initial definition and a set of theoretical assumptions.

These measurement frameworks are the following:

1. The Entrepreneurship Indicators Programme – EIP (OECD/EUROSTAT).
2. The EIP Demography Statistics (EUROSTAT).
3. Global Entrepreneurship Monitor – GEM.
4. The Global Entrepreneurship & Development Index – GEINDEX.
5. The Regional Entrepreneurship and Development Index – REDI.
6. Digital Entrepreneurship Monitor – DEM.
7. The Community Innovation Survey – CIS (EUROSTAT)
8. Enterprise Surveys (World Bank Group).
9. Doing Business (World Bank Group).
10. EU Flash Barometer Survey on Entrepreneurship (EUROSTAT).
11. Panel Study of Entrepreneurial Dynamics – PSED.
12. The comparative entrepreneurship data for international analysis – COMPENDIA.

All those frameworks are briefly described in Annex 1.

In addition, six start-up mapping projects strongly related to digital entrepreneurship are briefly discussed. This second set is a recent wave of six mapping projects targeting start-ups and their ecosystems. Those are pragmatic projects gathering as much information as possible about start-ups, or derived categories (Gazelles, Scale-ups, etc.). They might be setting the scene for the future digital entrepreneurship measurement frameworks, strongly anchored in Big Data tools and their real-time processing capacities.

The following mapping projects have been investigated:⁷⁷

- Start up Genome,
- Compass,
- SEP Monitor- Start up Europe Partnership Scale-Ups Mapping,
- Cambridge Cluster Map,,
- Dynamic Mapping of web entrepreneurs and start-ups ecosystem,
- European ICT Poles of Excellence (EIPE).

Some prior precautionary remarks are here necessary as to remind that each framework is guided by its own definitions, purposes and methods.

Regarding definitions for example, the OECD was noting in 2008 that "entrepreneurial activity does not include those people considering or planning entrepreneurial activity. Such phenomena would be considered in relation to cultural or sociocultural analysis, which may indeed impact entrepreneurial activity indirectly. This could be contrasted with the Index of Total Entrepreneurial Activity (TEA-index) (Reynolds, Bosma, Autio, Hunt, De Bono, Servais, Lopez-Garcia, & Chin, 2005), which measures the ratio of people classified as entrepreneurs to the total adult population. The criteria for classification of „entrepreneur“ is based on whether a respondent is planning to, or owning and managing a business aged between 0 and 42 months (Minniti, Bygrave, &

⁷⁷ The investigation has been based in this case on desk research and a workshop where the initiatives have been presented. More about the workshop at: <http://is.jrc.ec.europa.eu/pages/ISG/EIPEWSmapping.html>. The Digital Entrepreneurship Monitor (DEM) was also presented at the workshop but is described in this report among the earlier twelve "Measurement frameworks".

Autio, 2006). The definitions proposed in this paper do not measure those "considering" entrepreneurial activity, nor does it differentiate between entrepreneurs in new or old ventures. The success of an entrepreneur's undertaking is based on the strength of their perceived opportunity, innovative capabilities and creative resources. It is not based on their intentions or on a supply/demand equation for entrepreneurs."

The Regional Entrepreneurship Development Index (REDI, 2013)⁷⁸ denounces that "most (...) indices are uni-dimensional and identify the percentage of population that is engaged or willing to engage in "entrepreneurial" activity (about self-employment, see Acs et al, 1994; Blanchflower et al., 2001; Grilo – Thurik, 2008; about business-ownership rate see Carree et al., 2002, Cooper – Dunkelberg, 1986; about new venture creation, see Gartner 1985; Reynolds et al., 2005; about the Total Early-stage Entrepreneurship Activity Index see Acs et al., 2005 or Bosma et al., 2009)." This, the report further declares, is a major limitation of most frameworks.

A specific problem is also to differentiate the purposes of each measurement framework as they do not all homogeneously survey the determinants (factors, barriers and drivers) to entrepreneurship, the performance (that is the effective creation of new economic activities) or the impacts (micro or macro-economic, social, etc.). Also, some frameworks extend their ambitions to the conception and evaluation of public intervention.

Along the same line, the recent mapping initiatives target a variety of purposes and therefore show to be little compatible with traditional statistical analysis, while, on the contrary, rich in information that only Big data methods allow nowadays.

Eventually, from a methodological perspective, the diversity in the measurement frameworks calls for caution when it comes to analytical purposes. A careful reading of the metadata of each framework is necessary as there are serious differences between the various approaches.

Still, this diversity in definitions, in purposes and in methods can guide and inspire the way the relevant features could be surveyed in future frameworks targeting digital entrepreneurship.

The next section is specifically investigating how Entrepreneurship measurement frameworks address – or do not - the three most substantial issues presented above: innovation, technology (ICT) and in-house entrepreneurial activity.

2.2.1 *Measuring the innovative dimension of entrepreneurship*

Since Schumpeter's seminal work, product, process and market innovation is considered to be at the core of entrepreneurial activity.⁷⁹ It is a necessary facet of it. The Entrepreneurship Indicators Programme (EIP) work and resulting definitions are extremely clear on this point (Section 1.2.2). Innovation is a substantial feature of entrepreneurship. The measurement of entrepreneurship needs to capture its innovative facet.

Unfortunately, innovation appears rather neglected in the definitions of entrepreneurship that drive measurement frameworks. Those definitions are often structured around the creation of any new company, be it innovative or not. It is therefore important to investigate, within the existing measurement frameworks and tools, to what extent and how innovation has been tracked and measured, if at all.

Innovation indicators could measure:

⁷⁸ Acs Z.J., Szerb L., Autio E., Ortega-Argiles R., Komlosi E. (2013).

⁷⁹ Together of course with the newness of the activity: creation of a new business/firm or expansion of in-house economic activity.

- innovative performance, assessing the existence and the characteristics of innovation within newly created economic activities (new firms / in-house new business activity). These indicators would be the ones reflecting the innovative facet of the entrepreneurial activity.⁸⁰
- the determinants of innovation –taking into account the factors affecting the emergence of innovation within the entrepreneurial activity.
- if possible, the impacts of innovation, in social or economic terms.

In the following paragraphs, twelve selected measurement frameworks for entrepreneurship have been investigated, as to identify if and how they refer and measure innovation.⁸¹ Those frameworks are all long-standing international benchmarks for the measurement of entrepreneurship and/or its determinants. They are acknowledged tools used by both the academic and policy communities.

2.2.1.1 The Entrepreneurship Indicators Programme⁸²

This is a joint OECD – EUROSTAT project. The aim of the Entrepreneurship Indicators Programme (EIP) was to develop a list of indicators, standard definitions and concepts, to facilitate the collection of statistics in this domain.

As mentioned above, its definition encompasses innovation with a direct reference to Schumpeter theoretical views: "Entrepreneurship is defined by the EIP as the phenomenon associated with entrepreneurial activity, which is the enterprising human action in pursuit of the generation of value, through the creation or expansion of economic activity, by identifying and exploiting new products, processes or markets." (OECD, 2013, p.12)

Curiously, the OECD Working paper setting the definitions and preparing for the indicators states: "We deliberately do not set out to define what 'new' is or how it should be defined. As discussed above the definition of new is in some respects an issue of convention. The indicators described in the OECD's framework all implicitly focus on different interpretations of what 'new' is, and this, perhaps surprisingly, is one of the strengths of the framework and the definitions, since ultimately it is the role of policy makers to determine the policy goals, and so the types of entrepreneurship and entrepreneurs they wish to foster." (Ahmad, N. and R. G. Seymour (2008)

When looking at the EIP measurement framework itself, the following two indicators can be associated to innovation:

- Among the determinants of entrepreneurship, within the market conditions: patent and standard systems
- Among entrepreneurship performance indicators: young or small firm's innovation performance.

The performance indicator "young or small firm's innovation performance" is particularly relevant for our purpose, but... it does not seem to be available. The data corresponding to the EIP framework are the Business Demography statistics (See next section) dedicated in EUROSTAT to the EIP. The Metadata issued by EUROSTAT lists all available indicators.⁸³ None of them refers to young and small firm's innovation performance.

The discrepancy between the indicators of the EIP framework and the data gathered in the Business Demographics has a simple explanation. The authors of the EIP framework point at the difficulty of their project: "*Many of these (indicators) can be produced using*

⁸⁰ Example: Number of newly created companies claiming a product innovation during the last year.

⁸¹ All those frameworks are briefly described in Annex 1.

⁸² See at <http://www.oecd.org/industry/business-stats/theentrepreneurshipindicatorsprogrammeeipbackgroundinformation.htm>

⁸³ See at http://epp.eurostat.ec.europa.eu/cache/ITY_SDDS/Annexes/bd_esms_an1.pdf. Last visited Sept 2014.

currently existing data sources, particularly sectorial and size breakdowns. Many others, however, will only be possible in the future as statistical capacities increase (...)." (Ahmad, Hoffman, 2007). For the innovation indicator, it has still not been the case, and even less so at sectorial level.

2.2.1.2 The EIP Business Demography Statistics⁸⁴

Eurostat is core to the entrepreneurship indicators programme (EIP) within which it ensures the collection of internationally comparable statistics. The announced challenge is to provide data that not only allows policy-makers and academics to understand better the rate and types of entrepreneurial activity, but also its impact (especially wealth creation, employment and productivity gains). The Business Demography Statistics adopts fully the definition of the EIP project which clearly integrates innovation. Still the Business Demography Statistics do not reflect this conceptual option.

EUROSTAT states that the empirical basis for work on entrepreneurship is still being developed. However, initial data grouped according to the EIP measurement framework are available. Information on different aspects of entrepreneurship can be found in several SBS domains:

- the size-class series within structural business statistics are a main source of data for analysing small and medium-sized enterprises (SMEs), including so-called micro enterprises with fewer than 10 persons employed;
- Business Demography Statistics – data on the active population of enterprises, their birth, survival and death – with a focus on how these events affect employment levels;
- there is a pilot survey on the factors of business success."⁸⁵

Within the dedicated EIP Business Demography Statistics, the collected indicators are:⁸⁶

- Population of active enterprises,
- Number of enterprise births,
- Number of enterprise survivals up to five years,
- Number of enterprise deaths,
- Related variables on employment,
- Derived indicators such as birth rates, death rates, survival rates and employment shares
- An additional set of indicators on high-growth enterprises and 'gazelles' (high-growth enterprises that are up to five years old).

There is no direct reference to innovation.

Among the performance indicators of the EIP section of the Business Demography statistics appear High-Growth firms and Gazelles. The definition of High-growth enterprises recommended by the EIP is as follows: All enterprises with average annualised growth greater than 20% per annum, over a three year period should be considered as high-growth enterprises. Growth can be measured by the number of employees or by turnover.

Gazelles form a subset of the group of high-growth enterprises; they are high-growth enterprises born five years or less before the end of the three-year observation period. Measured in terms of employment (or turnover), gazelles are enterprises which have been employers for a period of up to five years, with average annualised growth in

⁸⁴ See at: http://epp.eurostat.ec.europa.eu/portal/page/portal/european_business/special_sbs_topics/entrepreneurship_indicators

⁸⁵ Source: http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Entrepreneurship_indicators

⁸⁶ See at: http://epp.eurostat.ec.europa.eu/cache/ITY_SDDS/EN/bd_esms.htm

employees (or in turnover) greater than 20% a year over a three-year period and with ten or more employees at the beginning of the observation period. The share of gazelles is expressed as a percentage of the population of enterprises with ten or more employees.

To avoid the small size class bias that such definitions inevitably contain, the definitions include the further qualification that enterprises should have at least 10 employees at the start of any observation period (and this threshold applies to both the employment and turnover based measures).⁸⁷ The difference in scope and data reporting is that with Gazelles, one considers populations of newly born enterprises rather than entire populations of active enterprises.

There is some controversy about the use of these concepts: it is unfortunately usual to see them associated to innovative and successful firms, while those categories reflect strictly a momentary average growth (of employment or turnover), and an age criteria in the case of Gazelles. The concept does not enter any consideration about innovativeness. Those are performance indicators, within a demographic perspective: they measure the growth among the total population of firms (allowing for example the identification of more dynamic sectors), or a subset of the population, the youngest firms. But even here, controversy is at stake.⁸⁸

Eventually, Ahmad and Hoffmann (2007) argued already in favour of "these indicators as reflecting some evolution of entrepreneurship on a scale of impact's importance. High-growth firms require the creation of a firm, typically with employees, and many firms with employees, started out as one-man shows."

2.2.1.3 *The Global Entrepreneurship Monitor (GEM)*⁸⁹

Initiated in 1999, this defines entrepreneurs as "individuals actively involved in setting up or having set up a business they own or co-own." This definition does not refer at all to innovation.

Interestingly enough, a new optional module (in its revised model after 2010) was introduced⁹⁰ in the survey, dedicated to innovation. Bosma et al. (2012) acknowledge that in this revised model, GEM intends to describe and measure, in detail, the conditions under which entrepreneurship and innovation can thrive."

In this revised model, the GEM survey claims it addresses innovation at three levels:

- as context factor (determinant),
- as entrepreneurial aspiration (performance),

⁸⁷ These definitions appear in many official documents starting with the Eurostat-OECD Manual on Business Demography Statistics.

⁸⁸ OECD (2011b): "In a majority of countries, less than 1% (or even less than 0.5%) of the firms with ten or more employees are gazelles when the growth measure is based on employment; the share is slightly higher for gazelles as measured by turnover growth. Only in a few European ex-transition economies gazelles represent a share up to 4%, depending on the growth criteria. To be noted, the shares have been stable over the past three years of data collection". Source: To such observation, Olov Daunfeldt S., Johansson D. (2012) oppose: "Recent studies have suggested that most firms do not grow, and that a small number of high-growth firms create most new jobs. High-growth firms have therefore attracted an increasing amount of attention from researchers and policymakers. However, there is no uniform definition of what constitutes a high-growth firm in the literature. (The EUROSTAT/OECD) definition would exclude almost 95% of surviving firms in Sweden and about 40% of new private jobs during 2005-2008. We therefore advise caution in using this definition."

⁸⁹ See at <http://www.gemconsortium.org/>. The numbering of questions, and the questions might vary from one version to the other. The report investigated the 2011 version, which contains a block on innovation and another one on intrapreneurship.

⁹⁰ The questionnaire states: This is an optional module with questions about receptivity to innovations by individuals in their capacity as consumers, and, if employed (or self-employed), receptivity to innovations by organizations as seen by employees. This module measures demand of innovation, not supply of innovation in a country.

- as socio-economic development (impact).⁹¹

Within its performance indicators, GEM integrates in the Adult Population Survey (APS, 2010 – self-reporting methodology), the two following questions reflecting innovation:

- Q1G1 (2G1): Will all, some, or none of your potential customers consider this product or service new and unfamiliar?
- Q1G2 (2G2): Right now, are there many, few, or no other businesses offering the same products or services to your potential customers?
- Q1G4 (2G4): What proportion of your customers will normally live outside your country?

Further in its 2011 APS Questionnaire, GEM offers an optional Innovation module of questions. These seem to investigate the propensity of the firm to access and incorporate innovation rather than produce it.⁹²

The National Expert Survey⁹³ includes two determinant indicators that can be related to innovation:

- R&D transfer: The extent to which national research and development will lead to new commercial opportunities and is available to SMEs.
- Commercial and professional infrastructure: The presence of property rights (...) and institutions that support or promote SMEs.

2.2.1.4 The Global Entrepreneurship & Development Index – GEDI or GEINDEX⁹⁴

This is partly built upon the GEM data, but complemented with other sources. It states that the most common features of the various definitions of entrepreneurship include unique traits, risk-taking, opportunity recognition, motivation and exploitation, and innovation. Other characteristics include the output or impact of entrepreneurship, such as value creation, spill-over effects, or high growth (Autio, 2005, 2007; Praag & Versloot, 2007).⁹⁵

It defines entrepreneurship as "the dynamic, institutionally embedded interaction between entrepreneurial attitudes, entrepreneurial abilities and entrepreneurial aspirations by individuals, which drives the allocation of resources through the creation and operation of new ventures".⁹⁶

Consequently, it envisages to measure entrepreneurial performance over three sub-indexes, 14 pillars, and 31 individual and institutional variables. (Acs, Szerb. 2010)

The three sub-indexes (the "3 As") are: entrepreneurial attitudes, entrepreneurial abilities and entrepreneurial aspirations. The Aspiration sub-index is the closest to a measurement of entrepreneurship performance.

This sub-index is defined as the efforts of the early stage entrepreneur to introduce new products and services, develop new production processes, penetrate foreign markets, substantially increase the number of firm employees, and finance the business with either formal or informal venture capital, or both.

Innovation is clearly embedded in this third sub-index, even though it is absent in the definition. Still, the authors themselves state that the capability to produce or sell products that customers consider to be new is one of Schumpeter's forms of creating "new combinations" (Schumpeter 1934). Applying or creating new technology and

⁹¹ A careful review of the survey did not allow us to identify the questions or indicators corresponding to impacts. Further investigation should be carried out with the direct involvement of the survey authors.

⁹² See at: <http://www.gemconsortium.org/docs/download/2594>

⁹³ The questionnaires of the Experts Survey are not made available.

⁹⁴ See at <http://www.thegedi.org/>

⁹⁵ Acs, Szerb. 2014, p.65.

⁹⁶ Acs Z., Szerb L., Autio E. (2014). p.66.

production processes is presented as another important feature of businesses with high growth potential (Acs and Varga 2005). Internationalization is believed to be a major determinant of growth,⁹⁷ while it also can be seen as assessing the access to new markets.

The remaining Aspiration indicators are not related to innovation. The role of “gazelles” or high-growth businesses is presented as vital for the economy (Impact).⁹⁸ The availability of risk finance, in particular equity rather than debt, is rather a determinant, seen as an essential precondition for realizing significant entrepreneurial aspirations that are beyond the personal financial resources of individual entrepreneurs (Bygrave, Hay, Ng and Reynolds 2003, Gompers and Lerner 2004). Consequently, the following indicators reflect directly or indirectly innovation in the Individual Variables of the GEDI. The GEDI uses data from the GEM survey the following individual⁹⁹ performance indicators:

- New Product: Percentage of the TEA¹⁰⁰ businesses offering products that are new to at least some of the customers
- Export: Percentage of the TEA businesses where at least some customers are outside the country (over 1%).

It also looks at a determinant:

- Competitors: Percentage of the TEA businesses started in those markets where not many businesses offer the same product.

Second, the GEDI extracts institutional¹⁰¹ indicators from a variety of sources,¹⁰² reflecting directly or indirectly innovation. The indicators reflecting innovation are:

- GERD data¹⁰³
- Technology transfer¹⁰⁴
- Economic globalisation.¹⁰⁵

⁹⁷ The authors follow here De Clercq, Sapienza, and Crijns 2005.

⁹⁸ The authors claim that only a few businesses, perhaps 2-4%, are responsible for 60 to 80% of new job creation.

⁹⁹ Individual indicators are those extracted from the Adult Population Survey of the GEM

¹⁰⁰ The Index of Total Entrepreneurial Activity (TEA-index) measures the ratio of people classified as entrepreneurs to the total adult population. The criteria for classification of “entrepreneur” is based on whether a respondent is planning to, or owning and managing a business aged between 0 and 42 months.

¹⁰¹ Institutional indicators are Entrepreneurship Framework Conditions (Access to finances, Government programs, etc.) that are surveyed through experts.

¹⁰² Transparency International, UNESCO, World Economic Forum, Heritage Foundation, World Bank, KOF Swiss Economic Institute, Coface and Groh et al.

¹⁰³ GERD as % of GDP. Source: UNESCO.

¹⁰⁴ Innovation Index points from the Global Competitiveness report of WEF.

¹⁰⁵ Part of the Globalisation Index published by KOF Swiss Economic Institute.

2.2.1.5 The Regional Entrepreneurship and Development Index (REDI)¹⁰⁶

This is a recent report issued by GEDI / GEINDEX researchers¹⁰⁷ on behalf of the European Commission (DG REGIO).

A part of the Europe 2020 agenda, the report encourages the design of regional innovation strategies for smart specialization with special attention to entrepreneurial activities as a key driver of economic recovery and employment growth. The Regional Entrepreneurship and Development Index (REDI) creates a composite indicator of regional entrepreneurship covering the 27 member states of the EU and Croatia at the NUTS-2 level.

REDI further illustrates the valuable potential of the GEM and GEDI surveys to address the entrepreneurship phenomena and its relation to innovation.

Beyond a multidimensional definition of entrepreneurship and its impacts,¹⁰⁸ REDI (2013) aims at capturing differences in the quality of entrepreneurial activity, such as its innovation facet: *"This is in contrast with most empirical investigations, which tend to rely on a simple, one-dimensional operationalization of entrepreneurship, such as self-employment rate, small business ownership rate, or new venture creation rate. (...) A major shortcoming of uni-dimensional measures is that the majority of them do not capture differences in the quality of entrepreneurial activity, such as creativity, innovation, knowledge and technology intensity, value creation, or orientation and potential for high growth."*¹⁰⁹

The authors state that entrepreneurial businesses are different from regularly managed businesses, and that it is particularly important to be able to identify the most relevant institutional and other quality-related interaction variables.

REDI is largely rooted in the rationale of the GEDI, exploited up to a NUTS 2 level, which makes it extremely relevant for EU policy making. As the GEDI, it builds upon three sub-indexes: entrepreneurial attitudes, entrepreneurial abilities and entrepreneurial aspirations. It measures entrepreneurial performance over those 3 sub-indexes, 14 pillars made out of 28 variables built upon 40 individual and institutional variables.

REDI offers indicators related to innovation. REDI extracts from the GEM survey¹¹⁰ a series of individual performance indicators:

- Competitors: % of the TEA¹¹¹ businesses started in those markets where not many businesses offer the same product
- New Product: % of the TEA businesses offering products that are new to at least some of the customer
- New Tech: Percentage of the TEA businesses using new technology that is less than five years old average (including one year).¹¹²

¹⁰⁶ See at <http://www.thegedi.org/regional-gedi/>

¹⁰⁷ Acs Z.J., Szerb L., Autio E. Ortega-Argiles, R. Komlosi E. (2013).

¹⁰⁸ "There is broad agreement that entrepreneurial behaviours and actions comprise multiple dimensions, such as opportunity recognition, risk taking, resource mobilization, innovation, and the creation of new organizations. The impacts of such behaviours and actions are equally varied and can include value creation, job creation, knowledge spillovers, and 'creative destruction'." Acs Z.J. et al. (2013), p.8.

¹⁰⁹ Source: Acs Z.J. et al. (2013), p.8.

¹¹⁰ For some data, REDI uses alternatively also: Poli-KIT database, in Capello and Lenzi (eds.) (2013), Territorial Patterns of Innovation: an Inquiry of the Knowledge Economy in European regions, Routledge, London, ch. 5.

¹¹¹ The Index of Total Entrepreneurial Activity (TEA-index) measures the ratio of people classified as entrepreneurs to the total adult population. The criteria for classification of „entrepreneur“ is based on whether a respondent is planning to, or owning and managing a business aged between 0 and 42 months (OECD, 2008).

¹¹² Curiously, this indicator is associated in the framework with Process innovation.

- Product innovation: The percentage of the enterprises answering yes to the following question: "During the three years 2008 to 2010, did your enterprise introduce new or significantly improved goods or services?"
- Tech Innovation: The percentage of enterprises answering yes to the following question "During the three years 2008 to 2010, did your enterprise introduce new or significantly improved methods of manufacturing or producing goods or services?"
- Exports: Percentage of the TEA businesses where at least some customers are outside country (over 1%)

In terms of institutional indicators, REDI gathers the following determinant indicators:

- An Innovation sub-index elaborated with the variables (Patents; Publications; Hitech, ICT and Biotech inventors) used for the regional Competitiveness Index 2010
- GERD data.¹¹³

2.2.1.6 The Digital Entrepreneurship Monitor (DEM)¹¹⁴

The European Commission's DG ENTR puts innovation (and ICT) at the centre of its definition of digital entrepreneurship where it clearly expresses that digital entrepreneurship is about improving business operations, inventing new business models, sharpen business intelligence, and engage with customers and stakeholders.

Its definition of entrepreneurship refer clearly to innovation: *"Digital entrepreneurship embraces all new ventures and the transformation of existing businesses that drive economic and/or social value by creating and using novel digital technologies. Digital enterprises are characterised by a high intensity of utilisation of novel digital technologies (particularly social, big data, mobile and cloud solutions) to improve business operations, invent new business models, sharpen business intelligence, and engage with customers and stakeholders. They create the jobs and growth opportunities of the future."* Such definition encompasses a perspective about innovation that does not necessarily comply with the Schumpeterian one.¹¹⁵ Still, innovation is seen as core to entrepreneurship.

Regarding innovation-related indicators, the DEM builds fully upon existing (official) statistical data from a variety of sources.¹¹⁶ It presents data on performance indicators:

- Percentage of SMEs introducing product or process innovations.
- Percentage share of turnover achieved by sales of new innovations.

¹¹³ GERD as % of GDP t regional level. Source: EUROSTAT.

¹¹⁴ See at <http://ec.europa.eu/enterprise/dem/>

¹¹⁵ The Schumpeterian definition of innovation (presented already in Section 1.1.1) is also the one taken up by the OECD or EUROSTAT and that structures the Community innovation Survey.

¹¹⁶ Sources are fully listed on each corresponding webpage, starting from: <http://ec.europa.eu/enterprise/dem/monitor/statistics#/home>

It also presents data on determinants (of innovation):

- on R&D input:

- Percentage share of government budget spent on research and development,
- Percentage share of Gross Domestic Product spent in business research and development,
- Number of researchers per a thousand employees,
- Percentage of Gross Domestic Expenditure spent on research and development that is financed from abroad,
- Percentage share of foreign non-EU PhD candidates enrolled in higher education.

- on R&D output:

- Number of European high-technology patents per million inhabitants,
- Number of international scientific co-publications (per million inhabitants).

- on educational level in the labour force:

- Percentage share of the national labour force in science and technology with skilled qualifications.

- on access to finances:

- Ease of Raising Money Through Local Equity Markets (1 to 7 scale, '7' is easiest),
- Entrepreneurs' ease of access to venture capital funds (1 to 7 scale, '7' is easiest).

- on innovation performance:

- Summary Innovation Index: Composite indicator for national innovation performance,
- Percentage share of the national labour force in knowledge intensive activities.

Unfortunately, the project did not develop that far a practical mode for measuring specifically ICT innovation defined (as by the project) as the utilisation of novel digital technologies (particularly social, big data, mobile and cloud solutions). The project stayed limited by the existing available data sources (largely exploited in the presentation of its indicators). It did develop a pilot trial derived from proprietary data of IDC and limited to several EU countries. This will be described in Section 2.2.2.6.

2.2.1.7 The EUROSTAT Community Innovation Survey (CIS)¹¹⁷

This is the European's iconic survey on innovation activities in enterprises. All its questions refer to innovation.

The survey defines innovation as "the introduction of a new or significantly improved product, process, organisational method, or marketing method by (an) enterprise. The innovation must be new to (the) enterprise, although it could have been originally developed by other enterprises."¹¹⁸

Eventually, the CIS provides statistics broken down by countries, type of innovators, economic activities and size classes. Unfortunately it does not offer breakdowns by age group.¹¹⁹ Therefore it does not allow us to differentiate the young or newly-born

¹¹⁷ See at <http://epp.eurostat.ec.europa.eu/portal/page/portal/microdata/cis>

¹¹⁸ Source: CIS 2010 Questionnaire. Available at:

http://epp.eurostat.ec.europa.eu/portal/page/portal/microdata/documents/CIS_Survey_form_2010.pdf

¹¹⁹ Some national statistical institutes offer access to data on the age of firms, See for an example focusing on Spain: Gabriele Pellegrino, 2014. The perception of obstacles to innovation along the firm's life cycle, mimeo. Presented at an IRI seminar at IPTS.

companies in the sample from the other firms. Similarly, its purpose is not to analyse the determinants of entrepreneurship, or the technological dimension of innovation.

Some information gaps could be compensated through the bridging of the CIS with, for example, register data. Such attempt has been the objective of the EssLait project, formerly funded by EUROSTAT¹²⁰ whose general scope was to apply a methodology for data linking between several EUROSTAT surveys and databases, and to generate micro-aggregate datasets for analysis.

The CIS, as European harmonised survey, is designed to provide information on innovation. It is therefore a fundamental building block that could contribute to the elaboration of a framework for data gathering on the innovative facet of entrepreneurship. Some Entrepreneurship measurement frameworks have started taking up the CIS questions as part of their questionnaires (GEDI, Section 2.2.1.5) or data release (DEM, Section 2.2.1.6).

2.2.1.8 The World Bank Enterprise survey¹²¹

It was launched in 2002, and defines entrepreneurial activity as the number of newly registered corporations per 1,000 working-age people.¹²²

It focuses on the many factors that shape the business environment. The data collected is focused on the determinants of Entrepreneurship, assuming that there is a strong causality link between business environment variables and entrepreneurship.

It covers a broad range of business environment topics including Regulations and taxes (9 indicators); Corruption (14 indicators); Crime (9 indicators); Informality (5 indicators); Gender (5 indicators); Finance (21 indicators); Infrastructure (18 indicators); Innovation and technology (6 indicators); Trade (14 indicators); Workforce (12 indicators); Firm characteristics (6 indicators); The biggest obstacle (15 indicators); Performance (3 indicators).

Reflecting this structure, the WB questionnaire raises the following innovation-related questions in its Innovation and Technology chapter H:¹²³

- H1: During the last three years, has this establishment introduced new or significantly improved products or services?
- H2: Were any of the new or significantly improved products or services also new for the establishment's main market?
- H3: During the last three years, has this establishment introduced any new or significantly improved methods of manufacturing products or offering services?
- H4.a: During the last three years, has this establishment introduced any new or significantly improved logistics, delivery, or distribution methods for inputs, products, or services?

¹²⁰ While the EssLait project demonstrated the limitations of such attempts (i.e. loss of data due to specificities of each survey and lack of compatibility among them), it still showed a huge potential in creating a unique bridged dataset and in identifying improvements to existing surveys as to allow for better matching, as well as potential for deeper analysis of the collected aggregated data. Unfortunately, the project has been interrupted end 2013. The data is planned to be made available by EUROSTAT in its Safe Centre. The work was part of the Modernisation of European Enterprise and Trade Statistics programme (MEETS) of EUROSTAT, aimed at improving the efficient production of statistics and secondary use of data while the analytical work related to the themes of the Digital Agenda for Europe. Available at: http://epp.eurostat.ec.europa.eu/portal/page/portal/information_society/methodology. It was preceded by ESSLimit Project and the ICT Feasibility Study.

¹²¹ See at <http://www.enterprisesurveys.org/>

¹²² As also in the World Bank's annual "Doing Business" report, the units of measurement are the private, formal sector companies with limited liability.

¹²³ Sources: Manufacture and Services Modules (v.2013).

- H4.b: During the last three years, has this establishment introduced any new or significantly improved supporting activities for your processes, such as maintenance systems or operations for purchasing, accounting, or computing?
- H5: During the last three years, has this establishment introduced any new or significantly improved organizational structures or management practices?
- H6: During the last three years, has this establishment introduced new or significantly improved marketing methods?
- H7: During the last three years, did this establishment spend on formal research and development activities, either in-house or contracted with other companies?

Out of the 137 indicators,¹²⁴ the following ten might be considered as related to innovation even though the purpose of the survey is to investigate the propensity and the conditions to start a new business ("newly registered corporation") rather than to start an innovative activity. These indicators can hence be seen first as measuring business performance and the determinants of business creation. The investigation did not allow identifying among the indicators, those that would reflect the answers to the above listed questions about innovation. Further investigation should be effectuated with the direct involvement of the survey authors to check for this apparent discrepancy.

- In the Finances chapter:
 - Percentage of firms identifying access to finance as a major constraint
- In the Innovation and Technology chapter:
 - [t1] Percentage of firms with internationally-recognized quality certification
 - [t4] Percentage of firms using technology licensed from foreign companies
- In the Trade chapter:
 - [tr4] Proportion of total sales that are domestic sales (%)
 - [tr5] Proportion of total sales that are exported directly (%)
 - [tr6] Proportion of total sales that are exported indirectly (%)
 - [tr15] Percentage of firms exporting directly (at least 1% of sales)
 - [tr10] Percentage of firms exporting directly or indirectly (at least 1% of sales)
- In the Workforce chapter:
 - [wk3] Number of permanent skilled production workers
 - [wk10] Percentage of firms identifying an inadequately educated workforce as a major constraint.

2.2.1.9 Doing Business (World Bank Group)¹²⁵

In Doing Business, entrepreneurship focuses on new private, formal sector companies with limited liability. In an additional dataset dedicated to Entrepreneurship,¹²⁶ data is provided on new business entry density, defined as the number of newly registered corporations per 1,000 working-age people (those ages 15–64).

Doing Business provides measures of business regulations and their enforcement across 185 economies. Each economy is ranked according to 10 sets of indicators. These are combined into an overall "ease of doing business" ranking. It provides quantitative measures of regulations for starting a business, dealing with construction permits,

¹²⁴ Full list and definitions available at: <http://www.enterprisesurveys.org/~media/GIAWB/EnterpriseSurveys/Documents/Misc/Indicator-Descriptions.pdf>

¹²⁵ See at <http://www.doingbusiness.org/>

¹²⁶ See at <http://www.doingbusiness.org/data/exploretopics/entrepreneurship>

getting electricity, registering property, getting credit, protecting investors, paying taxes, trading across borders, enforcing contracts and resolving insolvency. Doing Business also measures regulations on employing workers.

The 2014 Report of Doing Business¹²⁷ states that there is an established relation between good regulatory environment and innovative entrepreneurship: " (...) *where regulation is transparent, efficient and implemented in a simple way, it becomes easier for aspiring entrepreneurs to compete on an equal footing and to innovate and expand.*"¹²⁸ But Doing Business has not the purpose of measuring the innovation performance.

Doing Business clearly does not address the issue of innovation. Meanwhile, Doing Business serves often as complementary set of data for the building of indexes related to entrepreneurship as it assesses the regulatory business environment.

2.2.1.10 EU Flash Barometer Survey on Entrepreneurship¹²⁹

The European Commission's Directorate-General "Enterprise and Industry" has been studying the development of entrepreneurship in EU Member States for over a decade through a survey on entrepreneurial mind sets. Its presentation and reports refer to entrepreneurship as the activity of creating a new business and/or the status of being self-employed. In its survey, it defines entrepreneurship as "*turning ideas into action and developing one's own projects*".¹³⁰

The Eurobarometer survey investigates the evolution of entrepreneurial mind sets by addressing the socioeconomic profile of the interviewees as well as their views on self-employment or entrepreneurship: Drivers of entrepreneurship, Perceptions of entrepreneurship and the role of education, Motivation to become Entrepreneurs, Motivations to become Employees.

There is no dedicated focus to Innovation, but rather to individual determinants (mind set) of entrepreneurship.

One question, relative to the perception citizens have about entrepreneurship, refers to innovation:

- Q.7A offers to agree or disagree with the following statement: Entrepreneurs create new products and services that benefit us all.

In its latest analytical report (2012),¹³¹ the Flash Eurobarometer on entrepreneurship has also analysed character traits and personality characteristics of entrepreneurially active people. The survey notices some differences in the personalities of people with business experience and those without. Entrepreneurs seem to think of themselves as more inventive. This tests again a hypothesis about a pre-condition (determinant).

2.2.1.11 Panel Study of Entrepreneurial Dynamics – PSED¹³²

The Panel Study of Entrepreneurial Dynamics (PSED) research program, a project of the University of Michigan launched in 1988, is designed to enhance the understanding of how people start businesses. It is focused on the US. Entrepreneurship is defined as the

¹²⁷ See at: <http://www.doingbusiness.org/~media/GIAWB/Doing%20Business/Documents/Annual-Reports/English/DB14-Full-Report.pdf>, p.27.

¹²⁸ Source: <http://www.doingbusiness.org/~media/GIAWB/Doing%20Business/Documents/Annual-Reports/English/DB14-Full-Report.pdf>, p.27

¹²⁹ See at <http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/eurobarometer/>

¹³⁰ From Eurobarometer, 2012. Entrepreneurship in the EU and beyond. http://ec.europa.eu/public_opinion/flash/fl_354_en.pdf, p.116. Elsewhere, in its presentation, it adopts the definition of entrepreneurship as presented under the Entrepreneurship and Innovation programme (2007-2013): "*entrepreneurs are individuals who have the ideas and are willing to take the risks necessary to get a firm off the ground*". See at: http://ec.europa.eu/enterprise/policies/sme/promoting-entrepreneurship/index_en.htm

¹³¹ Source: http://ec.europa.eu/public_opinion/flash/fl_283_en.pdf

¹³² See at <http://www.psed.isr.umich.edu/psed/home>

creation of new firms and new ventures, an activity that shows contributions to innovation, job growth, and improved productivity. Entrepreneurship is a potential factor of innovation, but it does not encompass innovation by nature.

The survey questionnaire¹³³ includes 5 questions reflecting innovation, mainly observed through determinants-related indicators, as it investigates intentions and inputs rather than effective innovation:¹³⁴

- Q. P4. The social norms and culture of your community encourage creativity and innovativeness.
- Q. U12. As of today, how many owners (...) workers are responsible for research and development of new products and services?
- Q. V36. For this same twelve-month period, what (will be/was) the total spent on research and development of new products and services?
- S5. Will spending on research and development be a major priority for this (new) business?
- V36. For (first/past) twelve-month period, what (will be/was) the total spent on research and development of new products and services?
- Q. V37. Would you say the total spent on research and development of new products and services in the (first/past) twelve months of operation (would be/was) fifty thousand dollars or more?

2.2.1.12 *The comparative entrepreneurship data for international analysis – COMPENDIA*¹³⁵

The dataset COMPENDIA contains harmonized data on the number of business owners and the business ownership rate (number of business owners as share of labour force) for 30 OECD countries over the period 1970-2007. Business ownership rates have been made comparable across countries and over time. For that purpose figures from official OECD statistics have been corrected for deviating business ownership definitions and for trend breaks.

The dataset is composed of 15 variables, none of them referring to innovation.

2.2.1.13 *Is innovation centre stage to the measurement frameworks of entrepreneurship?*

This section has explored 12 measurement frameworks to identify the status of innovation in those frameworks.

This investigation shows that the majority of the measurement frameworks do not refer to innovation in their definition, with the noticeable exceptions of the Entrepreneurship Indicators Programme, the Global Entrepreneurship Development index (and the derived REDI) and the Digital Entrepreneurship Monitor.

Paradoxically, when looking at the indicators they collect, most frameworks do investigate innovation.¹³⁶ Still, a closer look at the frameworks shows that innovation is often treated as a determinant factor (influencing the emergence of entrepreneurship defined as the creation of new firms).

¹³³ For the purpose of this report, the latest available version (Wave F 2010) of the questionnaire has been used.

¹³⁴ An indirect assessment of the interest of PSED for innovation is offered by the updated bibliographic list of publications resulting from the survey. Only 5 articles (out of some 300 titles) refer to innovation.

¹³⁵ See Annex 1.12.

¹³⁶ With the exception of the Business Demography Statistics and World Bank's Doing Business.

In half of the cases, the frameworks measure innovation as a performance indicator (considering innovation as an intrinsic characteristic of (Schumpeterian) entrepreneurship, and investigating its modalities).

This is particularly the case of the EIP, with its (unfortunately pending¹³⁷) measurement of the population of Young and small firm's innovation performance. The family of frameworks around the GEM, GEDI, REDI and also the World Bank Enterprise Surveys show probably the most systematic efforts to capture innovation performance, and, their measurements resemble each time more the standard measurements rooted in the Community Innovation Survey: the declared existence of product, process or market innovation.

The majority of measurement frameworks also assume that innovation is a (potentially favourable) determinant of entrepreneurship: an innovation-friendly environment would be entrepreneurship-friendly also.

Putting aside the Community Innovation Survey¹³⁸ as it does not relate to entrepreneurship at all, the Digital Entrepreneurship Monitor offers the broadest coverage of determinants of entrepreneurship. It organises the determinants around the following 5 pillars: Knowledge base, Business environment, Finances, Skills and e-Leadership, and Culture. Among each of those, some of the indicators are directly or indirectly related to innovation

The remaining measurement frameworks are less exhaustive, by covering only one or another aspect, typically in relation with R&D and/or skills.

No framework seems to directly collect data on innovation impacts. This is probably a reasonable position as the causality links that lead to economic performance (employment, value-added, etc.) are probably more complex than a single equation bridging innovation and economic performance.

It is now time to answer to the section's question: Is innovation centre stage to the measurement frameworks of entrepreneurship? While innovation is absent from definitions, inducing that innovation is not considered as a substantial characteristic of entrepreneurship, it nevertheless reappears in the measurement frameworks themselves. Its performance is only measured in a minority of closely related frameworks (GEM / GEDI / REDI) and gain inspiration from the CIS.

The way forward with a measurement framework for (Schumpeterian) entrepreneurship would need to much better take in account innovation as intrinsic characteristic of entrepreneurship, and explore its modalities (product, process, market).

This encompasses the need to:

- Take on board an operational definition of innovation, as already developed in the Entrepreneurship Indicators Programme (Section 1.2.2) or the EC Green paper on Entrepreneurship (See Section 2.2.3)
- Define innovation performance indicators and design the corresponding questions (in line with CIS and REDI, for example)
- Define innovation determinants indicators and design the corresponding questions (in line with CIS and DEM. For example),

¹³⁷ Pending as it never came to be developed: see Section 2.2.1.1.

¹³⁸ Quite naturally, the Community Innovation Survey shows the most exhaustive coverage of the determinants of innovation. The CIS questionnaire in its chapter 8 "Factors hampering innovation activities" presents 4 categories of factors potentially hampering innovation activities: Cost factors, Knowledge factors, Market factors and "Reasons not to innovate" A specific chapter (6) Sources of information and cooperation explores somehow the role of the system of innovation. But in the specific case of this survey, it is not related to entrepreneurship at all. As a reminder, the CIS does not collect the age groups of the surveyed firms. It hence does not allow for an analysis of the innovative activities of newly born firms, for example.

- While paying attention from the start to their consistency and usefulness in view of an economic impact assessment for any group of analysed firms (new/old; small/large; non-innovative / innovative; per sector; etc.).

Very clearly, some of the above described frameworks are advanced versions of what could become an improved measurement framework for (Schumpeterian) entrepreneurship.

2.2.2 Measuring the technological (ICT) dimension of entrepreneurship

As a reminder,¹³⁹ the current report proposes to define Digital entrepreneurial activity as the "enterprising human action in pursuit of the generation of value, through the creation or expansion of economic activity, by identifying and exploiting new ICT or ICT-enabled products, processes and markets".

Technology (ICT) is seen as an essential component of innovation, which together with the creation of a new activity (new business or in-house new business activity) corresponds to the entrepreneurial drive. Measuring technology here is about measuring the role of technology within innovation, and innovation as a characteristic of entrepreneurship performance.

Technology (ICT) indicators could measure:

- technology (ICT) performance, assessing the existence and the characteristics of technology (ICT) within newly created economic activities (new firms / in-house new business activity). These indicators would be the ones reflecting the technological facet of the innovation
- the determinants of the nature and role of technology (ICT) in innovation – giving account of the factors affecting the selection and use of technology within the innovation
- and, if possible, the impacts of the technological facet of innovation, in social or economic terms.

As explained in the earlier section, twelve measurement frameworks for entrepreneurship have been investigated.¹⁴⁰ In addition, six start-up mapping projects are briefly discussed. These additional mapping projects have recently made up a wave of initiatives targeting (ICT) start-ups and their ecosystems, which often corresponds to political needs and initiatives. These projects help to set the scene for a digital entrepreneurship measurement framework, as they usually target ICT as a technology and/or a sector. Methodologically, they are strongly anchored in Big Data tools and their real-time processing capacities.

2.2.2.1 The Entrepreneurship Indicators Programme (EIP)¹⁴¹

This is a joint OECD – EUROSTAT project that developed a list of indicators, standard definitions and concepts. Its definition of entrepreneurship makes no reference whatsoever to technology: "*Entrepreneurship is defined by the EIP as the phenomenon associated with entrepreneurial activity, which is the enterprising human action in pursuit of the generation of value, through the creation or expansion of economic activity, by identifying and exploiting new products, processes or markets.*" (OECD, 2013, p.12). Therefore, no indicator of its measurement framework alludes to technology, and even less so to ICT.

¹³⁹ See Section 1.2.3.

¹⁴⁰ All those frameworks are briefly described in Annex 1.

¹⁴¹ See at <http://www.oecd.org/industry/business-stats/theentrepreneurshipindicatorsprogrammeeipbackgroundinformation.htm>

Still, the measurement framework proposes 16 indicators among the determinants listed in the category of "Creation and diffusion of knowledge".¹⁴² This group of determinants are classified under the following categories:

- R&D activity: on R&D expenditures and patenting,
- Transfer of non-commercial knowledge: focused on universities,
- Cooperation among firms: with a single indicator about SMEs,
- Technology availability and take up.

In this last sub-category of Technology availability and take up, appear some indicators which relate directly to technology and ICT:

- Turn-over in eCommerce,
- Enterprises using eGovernment,
- ICT expenditures as % of GDP,
- Expenditures in Telecom as % of GDP.

Of course, those indicators are far from satisfying the needs for measuring ICT and their role in innovation as characteristic of entrepreneurship performance. Those are seen here as generic determinants for entrepreneurship.

2.2.2.2 The EIP Business Demography Statistics¹⁴³

As already presented earlier, the dedicated EIP Business Demography Statistics indicators are:¹⁴⁴

- Population of active enterprises,
- Number of enterprise births,
- Number of enterprise survivals up to five years,
- Number of enterprise deaths,
- Related variables on employment,
- Derived indicators such as birth rates, death rates, survival rates and employment shares
- An additional set of indicators on high-growth enterprises and 'gazelles' (high-growth enterprises that are up to five years old).

There is no direct reference to technology, neither ICT, as a determinant or a characteristic in the observations. In line with the aim of the Business Demography Statistics, in addition to the standard NACE classification, various ICT aggregates, and various special aggregations of services activities such as Knowledge Intensive Business Services are offered. These allow us to isolate the ICT sector and sub-sectors data.

2.2.2.3 The Global Entrepreneurship Monitor (GEM)¹⁴⁵

¹⁴² This category was initially titled "R&D and technology" (OECD, 2008). The current indicators and their sources are listed at: <http://www.oecd.org/industry/business-stats/48130004.pdf> (OECD, 2011)

¹⁴³ See at: http://epp.eurostat.ec.europa.eu/portal/page/portal/european_business/special_sbs_topics/entrepreneurship_indicators

¹⁴⁴ See at: http://epp.eurostat.ec.europa.eu/cache/ITY_SDDS/EN/bd_esms.htm

¹⁴⁵ See at <http://www.gemconsortium.org/>

The GEM defines entrepreneurs as *"individuals actively involved in setting up or having set up a business they own or co-own."* This definition does not refer at all to technology, neither ICT. Still its measurement framework contains items related to the role of technology.

The Adult Population Survey (2011) contains two questions about the role of technology in the innovative aspect of the entrepreneurial activity (Q. 1.G.3 and 1.SP.6). Those are performance indicators. The questions are:

- 1.G.3 (also 2.G.3): Have the technologies or procedures required for this product or service been available for less than a year, or between one to five years, or longer than five years?
- 1.SP.6 (also 2.SP.6): To what extent is the technology of your business related to the core technologies of your most recent employer?

The National Expert Survey investigates a determinant that can be seen as indirectly (ICT) technology-related:

- Physical infrastructure and services: Ease of access to physical resources—communication, (...) —at a price that does not discriminate against SMEs.

2.2.2.4 *The Global Entrepreneurship & Development Index – GEDI or GEINDEX*¹⁴⁶

This defines entrepreneurship as *"the dynamic, institutionally embedded interaction between entrepreneurial attitudes, entrepreneurial abilities and entrepreneurial aspirations by individuals, which drives the allocation of resources through the creation and operation of new ventures"*.¹⁴⁷

It envisages to measure entrepreneurial activity over three sub-indexes, 14 pillars, and 31 individual and institutional variables. The three sub-indexes are: entrepreneurial attitudes, entrepreneurial abilities and entrepreneurial aspirations.

GEDI offers only few indicators related to technology. It extracts from the GEM survey the following individual performance indicator:

- New Tech: Percentage of the TEA businesses¹⁴⁸ using new technology that is less than five years old average (including one year).¹⁴⁹

Among determinants, one individual indicator¹⁵⁰ is collected from GEM, the Technology level¹⁵¹ while Firm-level Technology absorption capability¹⁵² and Internet usage¹⁵³ are collected from institutional (usually official) sources of data.

2.2.2.5 *The Regional Entrepreneurship and Development Index*¹⁵⁴ (REDI)

REDI is largely rooted in the rationale of the GEDI. Therefore it offers a very similar approach. As in GEDI, it builds upon three sub-indexes: entrepreneurial attitudes, entrepreneurial abilities and entrepreneurial aspirations. It measures entrepreneurial

¹⁴⁶ See at <http://www.thegedi.org/>

¹⁴⁷ Acs Z., Szerb L., Autio E. (2014). p.66.

¹⁴⁸ The Index of Total Entrepreneurial Activity (TEA-index) measures the ratio of people classified as entrepreneurs to the total adult population. The criteria for classification of „entrepreneur“ is based on whether a respondent is planning to, or owning and managing a business aged between 0 and 42 months (OECD, 2008).

¹⁴⁹ Curiously, this indicator is associated in the framework with Process innovation.

¹⁵⁰ Those indicators are collected through a questionnaire addressed to individual interviewees.

¹⁵¹ Based on GEM data, Percentage of the TEA businesses that are active in technology sectors (high or medium).

¹⁵² Scale assessment of technology absorption capability at country level. Source: Global Innovation Index of the WEF.

¹⁵³ Number of Internet users / 100 inhabitants. Source: ITU.

¹⁵⁴ See at <http://www.thegedi.org/regional-gedi/>

performance over those 3 sub-indexes, 14 pillars made out of 28 variables built upon 40 individual and institutional variables.

REDI offers only few indicators related to technology.¹⁵⁵ REDI extracts from the GEM survey¹⁵⁶ the same individual performance indicator as in GEDI:

- New Tech: Percentage of the TEA businesses¹⁵⁷ using new technology that is less than five years old average (including one year).¹⁵⁸

The determinants are again from GEM: the Technology level¹⁵⁹ is an individual indicator, while Firm-level Technology absorption capability¹⁶⁰ is collected from institutional (usually official) sources of data. Internet is not taken-up in the Connectivity indicators (while it is in GEM).

2.2.2.6 The Digital Entrepreneurship Monitor¹⁶¹ (DEM)

The DEM was initiated by DG ENTR is dedicated to digital entrepreneurship. Therefore, its definition of entrepreneurship refer clearly technology and ICT: *"Digital entrepreneurship embraces all new ventures and the transformation of existing businesses that drive economic and/or social value by creating and using novel digital technologies."* Such statement clearly indicates the role attributed by DEM to ICT within Innovation, and that of innovation within Entrepreneurship.

"Creating and using novel digital technologies" is further defined in technological terms: *digital enterprises are characterised by a high intensity of utilisation of novel digital technologies (particularly social, big data, mobile and cloud solutions).* Clearly, ICT-driven innovation is present in the perspective developed by DEM.

DEM offers a very thorough range of official statistics about the *determinants* of digital entrepreneurship, categorised along 5 pillars.¹⁶² Probably, the disputable aspect of these measurements is their specific relation to digital entrepreneurship rather than to entrepreneurship in general. The authors themselves write: *"The Digital Entrepreneurship Model provides an underlying logic for intervention to support all SMEs; not just digital entrepreneurs"*

Truly, the pillars of the DEM are a fair and thorough presentation of the main determinants groups described across the literature on entrepreneurship and on SME.

The DEM envisaged two performance indicators – *ICT start-ups* and *Digital Transformation* – that would measure the performance of Digital entrepreneurial activity as defined within the DEM project).

Digital Transformation would be measured as:

- the share of firms adopting new digital technologies (Cloud, Social, Mobile and Big Data)

¹⁵⁵ The REDI report states: "Technology Innovation has also two components. The individual variable (New technology) measures the technology innovation potential of the businesses. The institutional variable (Technology development) measures the financial aspect of innovation as the percentage of Research and Development in the regional gross domestic product (GERD). "This is a different view and the present report separates those two topics among Innovation and Technology.

¹⁵⁶ For some data, REDI uses: Poli-KIT database, in Capello and Lenzi (eds.) (2013), *Territorial Patterns of Innovation: an Inquiry of the Knowledge Economy in European regions*, Routledge, London, Ch. 5.

¹⁵⁷ The Index of Total Entrepreneurial Activity (TEA-index) measures the ratio of people classified as entrepreneurs to the total adult population. The criteria for classification of „entrepreneur“ is based on whether a respondent is planning to, or owning and managing a business aged between 0 and 42 months (OECD, 2008).

¹⁵⁸ Curiously, this indicator is associated in the framework with Process innovation.

¹⁵⁹ Based on GEM data, Percentage of the TEA businesses that are active in technology sectors (high or medium) and belong to the creative sector.

¹⁶⁰ Scale assessment of technology absorption capability at country level. Source: Global Innovation Index of the WEF.

¹⁶¹ See at <http://ec.europa.eu/enterprise/dem/>

¹⁶² Those statistics are available at: <http://ec.europa.eu/enterprise/dem/monitor/statistics#/home>.

- digital adoption indicators

ICT start-ups would be measured as:

- Birth rate and employment rate of start-ups in the ICT sector (e.g. #enterprises, #employees, average size).

Eurostat Business Demography Statistics and the European Cluster Observatory Database for the ICT start-ups were consulted to collect relevant indicators for the ICT start-ups. Unfortunately, official data from Business Demography Statistics do not really meet the technological requirements of the DEM definition.

For the Digital Transformation indicator, the project used proprietary IDC data in a pilot trial. The sources was the IDC annual company-level¹⁶³ European Vertical Market Study (2012). This survey investigates IT dynamics by company size and industry segments in Western Europe.¹⁶⁴

The IDC annual European Vertical Market Study (2012) was carried out in 5 European countries – France, Germany, Italy, Spain, UK (N. 1603). Central to the conceptual and methodological choices was the selection of "novel technologies": social media, cloud, mobile and big data technologies. Their declared adoption would sign up for both innovation and ICT, making out of any such firm, and "entrepreneurial firm".

Even though not built for the purpose of the DEM study and after some efforts dedicated to solve resulting caveats, the dedicated exploitation of this survey allowed identifying per economy and per sector, five groups of digital enterprises:

- Fully Digital companies that already adopt all four selected technologies (1.7%)
- Digital Mature companies that already adopt at least three out of the four technologies (4.2%)
- Digital Followers that already adopt at least two out of the four technologies (20.3%)
- Digital Beginners that adopt only one of the technologies (32.3%)
- 40% of EU companies are considered to be non-digital firms, i.e. they are not adopting any of the novel technologies.

Within the limitations of a survey designed for another purpose (geographical scope, size of companies, etc.), the trial delivered the above mentioned interesting results. Unfortunately further details were not released publicly.¹⁶⁵

All together the DEM offered an interesting snapshot of digital entrepreneurship performance. Of course, its approach to "novel technologies" and to the role of technology in innovation is debatable, as well as its criteria for defining digital entrepreneurship.

Regarding (ICT) technology-related determinants, the DEM presents the following data using official sources:

- Capacity of businesses to integrate new technologies in the firm (Global Competitiveness Report - GCI)
- Percentage share of enterprises using automated data exchange ICT systems outside the enterprise (EUROSTAT)
- Percentage share of enterprises (excl. financial sector) selling at least 1 per cent of turnover online (EUROSTAT).

¹⁶³ Companies above 10 employees.

¹⁶⁴ The survey is IDC proprietary data. Therefore, data and results have not been made public.

¹⁶⁵ To the best knowledge of the author of this report.

- Percentage share of national households with a Broadband Internet Connection (EUROSTAT).
- Number of secure internet servers per 1 million people (World Economic Forum).
- Percentage share of wholesale revenues invested in telecom networks (DAE data – DG CNECT).
- Percentage share of enterprises with fixed or mobile broadband Internet access (EUROSTAT).
- Percentage share of the national labour force in knowledge intensive activities (PROINNO – DG ENTR).
- Percentage share of employees in enterprises with qualified ICT skills (EUROSTAT).

All such data comes from existing (official) sources. As cautiously expressed by its authors, *"The indicators used in this data visualisation are the best statistics and measures that can be found to represent the components that comprise each pillar of the conceptual model."* The DEM did not step beyond this limitation.

2.2.2.7 The Community Innovation Survey (CIS)¹⁶⁶

This is the European harmonised survey on innovation activities in enterprises. All its questions refer to innovation.

Regarding innovation, the CIS offers the following definitions (Questionnaire 2010):

- A product innovation is the market introduction of a new or significantly improved good or service with respect to its capabilities, user friendliness, components or sub-systems.
 - Product innovations (new or improved) must be new to your enterprise, but they do not need to be new to your market.
 - Product innovations could have been originally developed by your enterprise or by other enterprises.

A good is usually a tangible object such as a smart phone, furniture, or packaged software, but downloadable software, music and film are also goods. A service is usually intangible, such as retailing, insurance, educational courses, air travel, consulting, etc.

- A process innovation is the implementation of a new or significantly improved production process, distribution method, or supporting activity.
 - Process innovations must be new to your enterprise, but they do not need to be new to your market.
 - The innovation could have been originally developed by your enterprise or by other enterprises.
 - Exclude purely organisational innovations.

The CIS questionnaire 2010 raises two questions which might be seen as technology or Information and Communication Technologies (ICT)-related determinants:

- Among the Knowledge factors hampering product or process innovation, Question 8.1 explores the *"Lack of information on technology."*
- Investigating the Skills of individuals employed, Question 11.1 refers to the *availability¹⁶⁷ of skills such as Web design, Software development or Multimedia.*

¹⁶⁶ See at <http://epp.eurostat.ec.europa.eu/portal/page/portal/microdata/cis>

¹⁶⁷ In-house or from external sources.

The purpose of the CIS is to analyse innovation and its determinants without exploring specifically the technological dimension of innovation. Such information could be reconstructed through the bridging of the CIS with, for example, the Firm level ICT use survey. As explained earlier (Section 2.2.1.7), such attempt has been the objective of the already mentioned EssLait project, formerly funded by EUROSTAT.

2.2.2.8 The World Bank Enterprise surveys¹⁶⁸

These surveys define entrepreneurial activity as the number of newly registered corporations per 1,000 working-age people.¹⁶⁹ They focus on the many factors that shape the business environment.

Doing so, they offer a brief insight into technological (ICT) characteristics of firms. As explained by the World Bank (2014), the Enterprise Surveys *"provide indicators that describe several dimensions of technology use and innovation. (...) (In particular,) these indicators demonstrate the use of information and communications technologies (ICT) in business transactions. ICT, such as the Internet, are important tools for all firms because they provide even the smallest of enterprises with the ability to reach national and international markets at lower cost."*

Reflecting this statement, the WB questionnaire raises the following technology-related questions in its Infrastructures and Services chapter:

- Question C.22a: At the present time, does this establishment use e-mail to communicate with clients or suppliers?
- Question C.22b: At the present time, does this establishment have its own website?
- Question C.22c; Does this establishment currently use cell phones for the operations of the establishment?
- Question C.30: To what degree is Telecommunications an obstacle to the current operations of this establishment?

In the Degree of Competition chapter:

- Question E.6:¹⁷⁰ Does this establishment at present use technology licensed from a foreign-owned company, excluding office software?

These firm characteristics are aimed at assessing the profile or potential of the firm, as resulting from the local business conditions. They do not aim to make an inventory of the determinants of innovation, or of entrepreneurship.

Out of the 137 indicators¹⁷¹ of the WB Enterprise surveys, only three result from the above questions and are related to technology, though they have little to do with entrepreneurship:

- T4: percent of firms using technology licensed from foreign companies.
- T5 Percent of firms having its own website.
- T6 Percent of firms using email to communicate with clients/suppliers.

Further investigation with the authors of the survey could help deepening the technological aspects in the survey, and improve its relation to entrepreneurship.

¹⁶⁸ See at <http://www.enterprisesurveys.org/>

¹⁶⁹ As also in the World Bank's annual "Doing Business" report, the units of measurement are the private, formal sector companies with limited liability.

¹⁷⁰ This question appears in the Manufacture module but not in the Services one.

¹⁷¹ Full list and definitions available at:
<http://www.enterprisesurveys.org/~media/GIAWB/EnterpriseSurveys/Documents/Misc/Indicator-Descriptions.pdf>

2.2.2.9 Doing Business (World Bank Group)¹⁷²

Doing Business provides measures of business regulations and their enforcement across 185 economies. Each economy is ranked according to 10 sets of indicators. These are combined into an overall "ease of doing business" ranking.

In an additional dataset dedicated to Entrepreneurship,¹⁷³ data is provided on new business entry density, defined as the number of newly registered corporations per 1,000 working-age people (those ages 15–64).

As for innovation (Section 2.2.1.9), Doing Business does not address the issue of technology.

2.2.2.10 The European Commission's EU Flash Barometer Survey on Entrepreneurship¹⁷⁴

This survey defines entrepreneurship as "*turning ideas into action and developing one's own projects*".¹⁷⁵ It investigates the evolution of entrepreneurial mind sets by addressing the socioeconomic profile of the interviewees as well as their views on self-employment or entrepreneurship: Drivers of entrepreneurship, Perceptions of entrepreneurship and the role of education, Motivation to become Entrepreneurs, Motivations to become Employees.

There is no question in the survey that addresses technology or Information and Communication Technologies (ICT).

2.2.2.11 Panel Study of Entrepreneurial Dynamics – PSED¹⁷⁶

This project of the University of Michigan was launched in 1988, and is designed to enhance the understanding of how people start businesses. It focuses on the US.

The survey questionnaire¹⁷⁷ includes a range of questions that investigate the role of technology from a variety of perspectives.

The determinants-related questions that explore the role of technology are the following:¹⁷⁸

- F8. The technical and scientific expertise of the start-up team (is important for this (new) business to be an effective competitor. (R: strongly agree, agree, etc.).
- F9. Developing new or advanced product technology or process technology for creating goods or services (is important for this (new) business to be an effective competitor. (R: strongly agree, agree, etc.).
- F11. You have mentioned a number of things that might be important for this (new) business to be competitive. Which of these is the single most critical thing for the survival of this (new) business (Among proposed responses: Technical expertise; Developing advanced technology).
- H6: What is the highest level of education [owner name] has completed (...)

¹⁷² See at <http://www.doingbusiness.org/>

¹⁷³ See at <http://www.doingbusiness.org/data/exploretopics/entrepreneurship>

¹⁷⁴ See at <http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/eurobarometer/>

¹⁷⁵ From Eurobarometer, 2012. Entrepreneurship in the EU and beyond. http://ec.europa.eu/public_opinion/flash/fl_354_en.pdf, p.116. Elsewhere, in its presentation, it adopts the definition of entrepreneurship as presented under the Entrepreneurship and Innovation programme (2007–2013): entrepreneurs are individuals who have the ideas and are willing to take the risks necessary to get a firm off the ground. See at: http://ec.europa.eu/enterprise/policies/sme/promoting-entrepreneurship/index_en.htm

¹⁷⁶ See at <http://www.psed.isr.umich.edu/psed/home>

¹⁷⁷ For the purpose of this report, the latest available version (Wave F 2010) of the questionnaire has been used.

¹⁷⁸ Some questions are shortened in this presentation as their full text version would not add value in this context.

- H19. What is [owner's name] primary role in the (new) business – would you say it is general management, sales, marketing, or customer service, finance or accounting, technical or science related, such as research or engineering, manufacturing or operations, or is it administration or human resource management?

The performance-related questions that explore the status of technology in the activity are the following:

- D11. (Has/Had) this (new) business developed any proprietary technology, processes, or procedures that no other company can use, (...)
- D12. In what month and year was the proprietary technology or process developed for this (new) business?
- S3. Were the technologies or procedures required for this product or service generally available more than a year ago?
- S4. Were the technologies or procedures required for this product or service generally available more than five years ago?
- S6. Would you consider this (new) business to be hi-tech?

Within PSED, the competitive strategy and the hi-tech orientation of the company are observed and the authors claim to offer a unique insight into US entrepreneurship

2.2.2.12 *The comparative entrepreneurship data for international analysis – COMPENDIA*¹⁷⁹

This contains harmonized data on the number of business owners and the business ownership rate (number of business owners as share of labour force) for 30 OECD countries over the period 1970-2007.

The dataset is composed of 15 variables, none of them referring to technology or Information and Communication Technologies (ICT).

2.2.2.12 *The contribution of recent projects for mapping ICT start-ups*

In the few last years, numerous initiatives have been taken to map out start-ups and their ecosystems at national, regional or local level. These projects have themselves developed on the emergence and popularity wave of Big Data processing and visualisation tools.

A rapid search on Internet allows identifying several dozens of such initiatives,¹⁸⁰ rooted in more or less formal organisational grounds, explicit mission statements and robust theoretical and methodological foundations. One must admit that in the majority of the cases, those aspects are kept little documented in the background.

Some such projects have gained a strong visibility in political circles, not least because they have been initiated and funded by the European Commission itself. To better understand the benefits and limitations of those projects, the JRC-IPTS organised in

¹⁷⁹ See Annex 1.12.

¹⁸⁰ Some examples of such freely-available exercises: Berlin: <http://berlinstartupmap.com/>; London: <http://roundabout.io/>; Copenhagen: <http://map.copenhagenstartups.com/>; Spain: <https://startupxplore.com/infographic/>; Luxembourg: <http://www.posttelecomblog.com/new-interactive-map-visualizes-the-dynamic-startup-ecosystem-in-luxembourg/>; Germany: <https://startupxplore.com/>; Israel: <https://mappedinisrael.com/>; Chicago: <http://www.builtinchicago.org/companies/map-chicago-startups>; New-York: <http://idea.syr.edu/mapping-upstate-new-yorks-startup-ecosystem/>; Los Angeles: <http://www.represent.la/>; USA: <http://phillystartupleaders.org/map/>; Singapore: <http://www.mindmeister.com/136732137/startup-ecosystem-map>; Global: <http://mapyourstartup.co/>; Global: <http://www.representmap.com/>; Global: <https://angel.co/maps>; Global: <http://startup-map.datalysed.com/>

Brussels, on 4th of July 2014, a one-day workshop gathering six of those initiatives, to be presented and debated.¹⁸¹

The mapping initiatives, and their representatives, were the following:¹⁸²

1. Startup Genome project
2. Compass project
3. SEP Monitor – Startup Europe Partnership Scale-Ups Mapping project
4. Cambridge Cluster Map
5. Dynamic Mapping of web entrepreneurs and start-ups ecosystem
6. European ICT Poles of Excellence (EIPE).

The main observations that came out of that workshop were the following:

- There is a wealth of initiatives to map start-ups, some of those funded by the European Commission, some through other means. All show high ambitions in terms of scope or analytical capabilities.
- Not all initiatives target ICT start-ups, neither are capable of offering sectorial or techno-related information. In turn, the ICT targeted initiatives sometimes develop towards newly created objects of analysis (hubs, poles, scale-ups, scalers) whose strict definition poses later issues.
- Big data (and their sources) are very usefully at stake in most projects. It should be taken in account that those data might show difficult integration with official statistics.
- The already observable results raise high expectations among policy makers (and probably also VC, entrepreneurs, post-PhD students, etc.) and that momentum will not decline in the coming years.
- Among those many initiatives, there is a diversity of aims, scope, tools and customers. There is also a resulting high diversity of observed objects, of definitions and taxonomies, indicators, data sources, data collecting and processing tools.
- High ambitions, high expectations, and diversity of frameworks put a lot of pressure on the projects to ensure the robustness of their results: grounded theoretical frameworks, sound collecting and analytical methodologies, validity and reliability of data, long time series and comparability, etc.

This wealth, expectations and diversity, together with the challenges they raise, might motivate collaboration across projects, when it comes to addressing the specific issue of digital entrepreneurship, its start-ups and ecosystems.

Collaboration might be the way forward as several issues could be better addressed by pooling the advanced features of various projects:

- Credible population coverage of start-ups and their ecosystems (issue of geographical target (EU 28 Member States, USA, Asia, BRICS, etc.), issues induced by the use of various crowdsourcing techniques, by-nature changing environment, etc.)
- Innovative dimension of start-ups/entrepreneurship, role of ICT in innovation
- Sector specialization (ICT, Bio, KITS, etc.)

¹⁸¹ The Minutes of the workshop , together with all workshop public documents are available at; <http://is.jrc.ec.europa.eu/pages/ISG/EIPEWSmapping.html>

¹⁸² The Minutes of the workshop include a note about the DEM as this project was presented also at the workshop. In this report, the authors have decided to attach the DEM to the traditional measurement frameworks presented earlier, as it relies mainly on official statistics.

- Access to complementary data, sharing of proprietary data, integration with official data
- Processing and visualization tools
- Comparability in results across geographies and across time periods
- Specialisation in topics for analysis (innovation, mentoring, financing, social and economic impacts, regional, urban and cluster dynamics, etc.).

To progress on such issues, it will be necessary to first standardize, at least partly, the many explicit or implicit definitions used to define the units of observation: start-ups, industrial sectors, hubs and poles, networks and value chains, life-cycle stages, etc. Centre-stage to this debate should stand the Schumpeterian concept of innovation. OECD/EUROSTAT earlier work (Entrepreneurship Indicators Programme) could be of great help.

It might be that the European research programme H2020 offers an opportunity to establish such collaborations on the longer term.

2.2.2.13 *Is technology, and in particular ICT, centre stage to the current measurement frameworks of entrepreneurship?*

This section has explored 12 measurement frameworks and 6 additional recent projects mapping ICT start-ups to identify the status of Technology, and in particular ICT, in those frameworks.

This investigation shows that none of the measurement frameworks refer to technology in their definition, with the noticeable exception of the Digital Entrepreneurship Monitor which is a recent initiative of the European Commission dedicated specifically to address this issue. This stays true with the Mapping projects, with again the exception of the European ICT Poles of excellence study, an internal CNECT / JRC study.

When looking closer at the indicators, eight measurement frameworks investigate technological factors as determinants of entrepreneurship, but only the PSED of the University of Michigan pursues some real intention with this topic. The Digital Entrepreneurship Monitor offers a broad inventory of possible official indicators, but their relation to innovation is unclear and many might appear as they are the only available in official statistics.

The measurement of the presence of technology *within* the product or process innovation is scarce. Only two frameworks succeed in investigating the issue. The Global Entrepreneurship Monitor offers two relevant indicators, while the PSED digs into five such indicators. The Digital Entrepreneurship Monitor confronted the difficulties of exploiting an existing survey deployed with a different purpose and generating proprietary data: this effort delivered only very partial results.

The observation of recent Start-ups Mapping initiatives (Point 2.2.2.12) is not necessarily more convincing, or leaves the analyst uncertain. Most such frameworks are recent and still deploying and testing provisional methodologies, themselves rooted in provisional theories and concepts. In general, the concept of start-up itself does not contain a technological dimension but rather a demographic one (the (variable) limit of age, or size). It so happens that in some cases, the project targets ICT start-ups, but here also, it is unclear if this focus is a sectorial one or not. All in all, these uncertainties could be easily clarified within most of the projects if this technological criteria were a guiding principle. Thus far, it has not been the purpose of the projects.

It is now time to answer to the section's question: Is technology (ICT) centre stage to the measurement frameworks of entrepreneurship? Generally speaking, technology, and even more so ICT, is absent from definitions and purposes, inducing that technology is not considered as a substantial characteristic of the innovation that would substantiate entrepreneurship.

Technology nevertheless reappears in some measurement frameworks, mainly as determinant of entrepreneurship (rather than innovation), and with its performance clearly addressed only by GEM (and lightly by GEDI), as well as by the PSED.

The way forward with a measurement framework for digital entrepreneurship would need to much better take in account ICT as intrinsic characteristic of ICT innovation, and explore its modalities (product, process, market).

This encompasses the need to:

- Develop and agree on an operational definition of ICT innovation, as already announced in Section XXX
- define ICT innovation performance indicators and design the corresponding questions (in line with CIS, GEM, GEDI or PSED as examples)
- define innovation determinants indicators and design the corresponding questions (in line with CIS or PSED as examples)
- while paying attention from the start to their consistency and usefulness in view of an economic impact assessment for any group of analysed firms (new/old; small/large; non-innovative / innovative; per sector; etc.).

Contrary to the concept of innovation (Section 2.2.1), ICT as substantial dimension of innovation does not find its way among the current measurement tools. The material (Concepts, relations, questions, wording) for an improved measurement framework for digital entrepreneurship still needs to be created.

2.2.3 Measuring the In-house Entrepreneurial Activity (IhEA)

As a reminder, the current report proposes to define Digital entrepreneurial activity as the "enterprising human action in pursuit of the generation of value, through the creation or expansion of economic activity, by identifying and exploiting new ICT or ICT-enabled products, processes and markets". The reference to an expansion of the economic activity, in line with the OECD definition, aims at including Intrapreneurship in the field of entrepreneurship.

Along the line of Schumpeter's MARK II theory, entrepreneurial activity in existing firms has been acknowledged for long. As a reminder, the OECD (2011) states: *"(...) (E)ntrepreneurs and entrepreneurship are not concepts that relate exclusively to small businesses or the self-employed, as many studies, through expedience, have often assumed. The EIP view is that the creation of value through the identification and exploitation of new products, processes and markets is not uniquely the preserve of small companies or entrepreneurs (...). Clearly, large companies can be entrepreneurial and these companies should not be ignored when formulating entrepreneurship policies."*

Already much earlier, the European Commission's Green Paper (2003)¹⁸³ defines Entrepreneurship as *"the mindset and process to create and develop economic activity by blending risk-taking, creativity and/or innovation with sound management, within a new or an existing organisation."*

It consists, from a corporate point of view, in using, within an existing firm, formal or informal methods to stimulate the emergence of new ideas among the staff with the resulting effect of generating a new product, process or market and develop it within or outside the company. From an employee point of view it can be defined as the voluntary and/or incentivised developing of new activities for their main employer, such as developing or launching new goods or services. This activity might also result in the creation of a new firm.

¹⁸³ Available at: http://eur-lex.europa.eu/LexUriServ/site/en/com/2003/com2003_0027en01.pdf

One can speak of corporate entrepreneurship, corporate venturing or intrapreneurship. Being the debated views about the meaning of each term, the report opts for a neutral wording: In-House Entrepreneurial Activity (IhEA).

This facet of entrepreneurship, often neglected by definitions and measurement frameworks for convenience, is even more important in the case of digital entrepreneurship. The characteristics of ICT as general purpose technology (GPT) make it the perfect candidate for generating innovation in other sectors: its pervasiveness – ICT are expected to spread to most sectors and its innovation spawning – ICT are expected to generate the invention and production new products or processes allow all companies of any sector to take up the technology and develop an innovative new in-house business activity based on a new process, product or market.

In-house entrepreneurial activity (IhEA) indicators could measure:

- IhEA performance, assessing the existence and the characteristics of IhEA within existing firms.
- the determinants of IhEA, giving account of the factors affecting the emergence of the entrepreneurial activity within existing firms.
- and if possible the impacts of IhEA, in social or economic terms.

As in the earlier Sections, twelve measurement frameworks for entrepreneurship have been investigated.¹⁸⁴ The report shows In-house entrepreneurial activity is rather a little explored issue.¹⁸⁵

2.2.3.1 The Entrepreneurship Indicators Programme (EIP)

The EIP definition refers to In-house entrepreneurial activity (IhEA) and (as mentioned earlier) the EIP documents clearly mention the important entrepreneurial role of existing (large) firms. EIP defines entrepreneurial activity as the enterprising human action in pursuit of the generation of value, through the creation *or expansion of economic activity*, by identifying and exploiting new products, processes or markets. Innovation from within an existing firm is meant to expand the economic activity of the firm.

Still, there is no corresponding indicator in the EIP measurement framework.

2.2.3.2 The EIP Business Demography Statistics

As mentioned earlier, these statistics gather the following indicators:¹⁸⁶

- Population of active enterprises
- Number of enterprise births
- Number of enterprise survivals up to five years
- Number of enterprise deaths
- Related variables on employment
- Derived indicators such as birth rates, death rates, survival rates and employment shares
- An additional set of indicators on high-growth enterprises and 'gazelles' (high-growth enterprises that are up to five years old).

There is no direct reference to IhEA.

¹⁸⁴ All those frameworks are briefly described in Annex 1.

¹⁸⁵ Searching further for other investigation frameworks, there appear to be some emerging activity about the topic such as the on-going (?) survey: <http://ii.bymonday.com/index.html>

¹⁸⁶ See at: http://epp.eurostat.ec.europa.eu/cache/ITY_SDDS/EN/bd_esms.htm

2.2.3.3 The Global Entrepreneurship Monitor (GEM)

The GEM annually monitors entrepreneurial attitudes and activities worldwide. The study of entrepreneurial activities is primarily focused on the process of setting up and managing a private business owned by one or more entrepreneurs. However, a comprehensive effort was undertaken to include Intrapreneurship in the GEM 2011 surveys.

The GEM 2011, in a special study¹⁸⁷ resulting from a dedicated set of questions about Intrapreneurship within the APS (Block 5),¹⁸⁸ focuses on entrepreneurial employees and shows that these individuals represent a relevant dimension of entrepreneurship revealing interesting patterns across the globe. Based on the literature, this report defines entrepreneurial employee activity as *'employees developing new activities for their main employer, such as developing or launching new goods or services, or setting up a new business unit, a new establishment or subsidiary'*. In particular, this report focuses on entrepreneurial employees who have a leading role in the creation and development of these new activities, which may include both top-down and bottom-up initiatives.

The report addresses country level issues such as the prevalence of entrepreneurial employees across different economies around the globe. It also examines the conditions that are conducive to this type of entrepreneurial activity.

The special topic study was carried out using the two usual data sources of the Global Entrepreneurship Monitor: the GEM Adult Population Survey (APS) and the National Experts Survey (NES). An advantage of this methodology is the opportunity to compare entrepreneurial employees with other employees and with early-stage entrepreneurs (i.e. individuals who own their business, or expect to own the business they are setting up), at both the country and the individual level.

2.2.3.4 The Global Entrepreneurship and Development Index – GEDI or GEINDEX

This index defines entrepreneurship as *"the dynamic, institutionally embedded interaction between entrepreneurial attitudes, entrepreneurial abilities and entrepreneurial aspirations by individuals, which drives the allocation of resources through the creation and operation of new ventures"*.¹⁸⁹

It envisages to measure entrepreneurial activity over three sub-indexes, 14 pillars, and 31 individual and institutional variables. The three sub-indexes are: entrepreneurial attitudes, entrepreneurial abilities and entrepreneurial aspirations. The structure and indicators of the Index do not investigate IhEA. In addition, many results are focused on the Total Entrepreneurial Activity (TEA-index) which refers to people classified as „entrepreneurs“ whether a respondent is planning to, or owning and managing a business aged between 0 and 42 months. Such focus is different and makes it difficult to interpret the data in terms of IhEA.

The GEDI report on Netherlands¹⁹⁰ shows a certain interest for the data about innovation within SME. Such data is rather similar to data that could be extracted from the CIS, per size group. Still, it does not intend to isolate and analyse the characteristics or conditions

¹⁸⁷ Bosma et al. (2013). Available at: <http://www.gemconsortium.org/docs/download/2890>. This is, to the best knowledge of the author of this report, the only survey-based study about the topic.

¹⁸⁸ The questionnaire states: *This is a required special topic module with questions about the involvement of employees in entrepreneurial activities, such as developing or launching new goods or services, or setting up a new business unit, a new establishment or subsidiary. The objective is to get an estimate of the number of these "intrapreneurs" as well as the nature and scope of their activities.* In addition, the questionnaire included an optional module with additional questions about the involvement of employees in entrepreneurial activities that national team could choose to include to provide additional details.

¹⁸⁹ Acs Z., Szerb L., Autio E. (2014). p.66.

¹⁹⁰ See at: http://www.thegedi.org/wp-content/uploads/2011/05/Acs_en_Szerb_GEINDEX_Netherlands1.pdf

of emergence of an activity within those SMEs that could be considered as in-house entrepreneurship.

2.2.3.5 The Regional Entrepreneurship and Development Index (REDI)¹⁹¹

The REDI is largely rooted in the rationale of the GEDI. Therefore it offers a very similar approach. No reference to intrapreneurship or corporate entrepreneurship is to be found.

2.2.3.6 The Digital Entrepreneurship Monitor (DEM)

The DEM defines digital entrepreneurship as embracing "*all new ventures and the transformation of existing businesses that drive economic and/or social value by creating and using novel digital technologies.*"

This definition opens the way towards two performance indicators – *ICT start-ups* and *Digital Transformation* - that would measure the performance of Digital entrepreneurial activity respectively as newly created firms and as in-house entrepreneurial activity (IhEA). The DEM performance indicators are:

- ICT start-ups as Birth rate and employment rate of start-ups in the ICT sector (e.g. #enterprises, #employees, average size).
- Digital Transformation as the share of firms adopting new digital technologies (Cloud, Social, Mobile and Big Data).

For the Digital Transformation indicator, which can be seen as the DEM version of IhEA, the project used proprietary IDC data in a pilot trial. The results of this trial have been presented in Section 2.2.2.6.

2.2.2.7 The EUROSTAT Community Innovation Survey (CIS)

This survey contains a question (CIS 2010, Question 11.2) on the subject of IhEA that investigates:

- whether one or several methods have been used within the firm to favour new ideas or creativity, with or without resulting success.

Even though the question is not related directly to the others, its analytical exploitation can give a flavour of the conditions (the "determinants") of IhEA within various countries, sectors, etc. while also assessing their performance (success / no-success). It might help validating through firm-level data, attitudes towards IhEA that are usually surveyed at individual level. In particular, it allows measuring IhEA in the ICT sector (because of the sectorial groups within the CIS data).

2.2.3.8 The World Bank Enterprise surveys¹⁹²

These surveys define entrepreneurial activity as the number of newly registered corporations per 1,000 working-age people.¹⁹³ The surveys focus on the many factors that shape the business environment.

In the questionnaire,¹⁹⁴ the Enterprise surveys do raise one question about In-house entrepreneurial activity:

- H8: During the last three years, did this establishment give employees some time to develop or try out a new approach or new idea about products or services, business process, firm management, or marketing?

Such question refers to a formal definition of intrapreneurship. Further investigation with the authors of the survey could help extending the topic beyond such formal definition.

¹⁹¹ See at <http://www.thegedi.org/regional-gedi/>

¹⁹² See at <http://www.enterprisesurveys.org/>

¹⁹³ As also in the World Bank's annual "Doing Business" report, the units of measurement are the private, formal sector companies with limited liability.

¹⁹⁴ Manufacture and service modules, v.2103.

Meanwhile, the question does not appear to be reflected among the 137 indicators of the Enterprise survey results.

2.2.3.9 *Doing Business (World Bank Group)*

This survey focuses on new private, formal sector companies with limited liability. In an additional dataset dedicated to Entrepreneurship,¹⁹⁵ data is provided on new business entry density, defined as the number of newly registered corporations per 1,000 working-age people (those ages 15–64). Doing Business provides measures of business regulations and their enforcement across 185 economies.

Evidently, the topic of In-house Entrepreneurial Activity is not covered by this framework.

2.2.3.10 *The European Commission's EU Flash Barometer Survey on Entrepreneurship*¹⁹⁶

This survey defines entrepreneurship in its survey as "*turning ideas into action and developing one's own projects*".¹⁹⁷ It investigates the evolution of entrepreneurial mind sets by addressing the socioeconomic profile of the interviewees as well as their views on self-employment or entrepreneurship: Drivers of entrepreneurship, Perceptions of entrepreneurship and the role of education, Motivation to become Entrepreneurs, Motivations to become Employees.

There is no question in the survey that addresses In-house Entrepreneurial Activity.

2.2.3.11 *The Panel Study of Entrepreneurial Dynamics (PSED)*

The PSED research program is designed to enhance the understanding of how people start businesses. It is focused on the US. Entrepreneurship is defined as the creation of new firms and new ventures, an activity that shows contributions to innovation, job growth, and improved productivity.

According to Parker (2009),¹⁹⁸ the PSED II (www.psed.isr.umich.edu) offers a dataset that makes a clean distinction between Nascent Entrepreneurs and Nascent Intrapreneurs start-ups, and contains a rich array of explanatory variables about individuals and their products; the processes they follow; and the organizational environments they operate in, including information about their current or former employers. The PSED II also contains information about people who choose neither intrapreneurship nor entrepreneurship.

The PSED appears hence as a potential source of inspiration, while its scope is currently limited to the US population.

2.2.3.12 *The comparative entrepreneurship data for international analysis – COMPENDIA*

COMPENDIA contains harmonized data on the number of business owners and the business ownership rate (number of business owners as share of labour force) for 30 OECD countries over the period 1970–2007. Business ownership rates have been made comparable across countries and over time. For that purpose figures from official OECD statistics have been corrected for deviating business ownership definitions and for trend breaks.

¹⁹⁵ See at <http://www.doingbusiness.org/data/exploretopics/entrepreneurship>

¹⁹⁶ See at <http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/eurobarometer/>

¹⁹⁷ From Eurobarometer, 2012. Entrepreneurship in the EU and beyond.

http://ec.europa.eu/public_opinion/flash/fl_354_en.pdf, p.116. Elsewhere, in its presentation, it adopts the definition of entrepreneurship as presented under the Entrepreneurship and Innovation programme (2007–2013): entrepreneurs are individuals who have the ideas and are willing to take the risks necessary to get a firm off the ground. See at: http://ec.europa.eu/enterprise/policies/sme/promoting-entrepreneurship/index_en.htm

¹⁹⁸ Parker S.C., 2009. Intrapreneurship or entrepreneurship? Journal of Business Venturing 26 (2011) 19–34, Elsevier.

The dataset is composed of 15 variables, none of them referring to In-house Entrepreneurial Activity.

2.2.3.13 *Is In-house Entrepreneurial Activity (IhEA) investigated by the current measurement frameworks of entrepreneurship?*

This section has again explored 12 measurement frameworks to identify the status of IhEA in those frameworks.

This investigation shows that none of the measurement frameworks refer to IhEA (or Intrapreneurship) in their definition, with the noticeable exception of the EIP and the Digital Entrepreneurship Monitor.

When looking closer at the indicators, at best three measurement frameworks investigate IhEA, with only the GEM publishing specific study based on its data. The Digital Entrepreneurship Monitor offers a pilot trial that unfortunately falls short of its ambitions.

Is In-house Entrepreneurial Activity (IhEA) investigated by the current measurement frameworks of entrepreneurship? Clearly not. IhEA is not on the agenda of those frameworks, or very marginally.

At best, the GEM and the PSED could probably serve as source of some inspiration for elaborating a measurement framework.

The way forward with a measurement framework for digital entrepreneurship that would pay attention to IhEA is a pending issue.

This encompasses the need to:

- Develop and agree on an operational definition of ICT innovation, starting with the already proposed in Section 1.2.3.
- Define IhEA performance indicators that would be relevant to the digital entrepreneurship phenomena,¹⁹⁹ and design the corresponding questions (in line with GEM or PSED as examples).
- define IhEA determinants indicators²⁰⁰ and design the corresponding questions (in line with CGEM or PSED as examples).
- while paying attention from the start to their consistency and usefulness in view of an economic impact assessment for any group of analysed firms (new/old; small/large; non-innovative / innovative; per sector; etc.).

Contrary to the concept of innovation (Section 2.2.1), In-house Entrepreneurial Activity as intrinsic part of the overall phenomena of Entrepreneurship does not find its way among the current measurement tools. The material (Concepts, relations, questions, wording) for an improved measurement framework still needs to be created.

2.3 Conclusions

In this chapter, rooted as Chapter 1 in the Schumpeterian theory of entrepreneurship, the report has confronted three substantial features of digital entrepreneurship – innovation, ICT technology and intrapreneurship – to a selection of twelve relevant measurement frameworks and six more recent mapping initiatives. All of those, in one or another way, aim at collecting empirical data about entrepreneurship.

The diversity of definitions, purposes and methods of those tools have shown to be important. Also, none of the current frameworks allows for measuring digital entrepreneurship and analysing its determinants. This is due to the purposes that have

¹⁹⁹ An In-house Entrepreneurial activity that would root itself into an ICT (enabled) innovation.

²⁰⁰ There are debates in the literature on the specificity of those factors as compared to those relevant to entrepreneurship seen as firm creation.

guided the construction of the current frameworks: some extend the definition of entrepreneurship to the creation of any new business, others show no interest in technology, and only a very few look at intrapreneurship.

A data-driven analysis of digital entrepreneurship and its determinants need to identify representative samples of innovative firms and gather company-level data to at least differentiate ICT-driven innovation from non ICT-driven innovation, entrepreneurship from intrapreneurship. It also needs to collect the information about a range of potential determinants and sufficient data as to assess the economic impacts of entrepreneurship at company, sector and macro-level. To serve European ambitions, it also calls for a thorough geographical coverage.

Probably, additional characteristics would further help describing the phenomena and interpreting its evolution: location and clustering, globalisation and trade, access to resources and flows, etc.

Several existing measurement frameworks show very interesting features in their questionnaires and indicators. These frameworks could serve as basis and inspire the elaboration of a measurement framework targeting digital entrepreneurship. The work developed within the Global Entrepreneurship Monitor (GEM) and the Global Entrepreneurship Index (GEDI) that of the Enterprise Survey of the World Bank and the experience gathered with the Community Innovation Survey of EUROSTAT show sufficient richness as to elaborate a tool in line with the Schumpeterian approach to entrepreneurship. Such newly elaborated tool, targeting specifically the measurement of digital entrepreneurship would be a major service to the political, industrial and scientific community at European and Member States level.

3 The way forward

3.1 At the core of EU policies²⁰¹

Entrepreneurship, and more recently digital entrepreneurship, has been a key feature of European policies for jobs and growth for more than a decade. As stated by the European Commission,²⁰² new firms and small and medium enterprises (SMEs) are major sources of jobs in Europe, hence EU-level policy makers have deemed it essential to improve the climate for SMEs and entrepreneurs.

This objective was developed within the Lisbon Strategy for Growth and Employment and gained momentum with the European Charter for SMEs (2000).²⁰³ The Charter set up a framework to help develop the SME sector and stimulate entrepreneurship (focusing on skills, regulation, and access to finance).

The Green Paper (2003) on Entrepreneurship²⁰⁴ helped to set the agenda further within a Schumpeterian perspective: "Entrepreneurship is first and foremost a mindset. It covers an individual's motivation and capacity, independently or within an organisation, to identify an opportunity and to pursue it in order to produce new value or economic success. It takes creativity or innovation to enter and compete in an existing market, to change or even to create a new market. To turn a business idea into success requires the ability to blend creativity or innovation with sound management and to adapt a business to optimise its development during all phases of its life cycle. This goes beyond daily management: it concerns a business' ambitions and strategy."

In 2004, the European Commission published its 'Action Plan: The European Agenda for Entrepreneurship'.²⁰⁵ The Action Plan was designed to provide a strategic framework for boosting entrepreneurship, and set out the key objectives to be achieved by the EU and Member States' policymakers in the following five strategic areas: stimulating entrepreneurial mindsets, encouraging more people to become entrepreneurs, equipping entrepreneurs for growth and competitiveness, improving the flow of finance and creating a more SME-friendly regulatory and administrative framework.

Based on these principles, the European Union developed a set of policies culminating in 2008 with The Small Business Act for Europe,²⁰⁶ a policy framework that reflects EU policy in the field of entrepreneurship and SMEs. It anchored SME policy in the mainstream of EU decision making.

In 2013, following a public consultation,²⁰⁷ the European Union launched the Entrepreneurship 2020 Action Plan.²⁰⁸ The Action Plan is built on three main pillars:

1. Entrepreneurial education and training,
2. Creation of an environment where entrepreneurs can flourish and grow, and
3. Developing role models and reaching out to specific groups whose entrepreneurial potential is not being fully realised or who do not receive traditional outreach for business support.

Within Pillar 2 of the Entrepreneurship Action Plan, six key areas were identified:

²⁰¹ Annex 2 offers a rapid overview of the main European policy documents related to SMEs and Entrepreneurship. This overview cannot be exhaustive neither up-to-date. We invite the interested reader to follow past and future developments on the relevant sites of the European Commission.

²⁰² Source: http://ec.europa.eu/employment_social/esf/docs/sf_entrepreneurship_en.pdf

²⁰³ Available at: http://ec.europa.eu/enterprise/policies/sme/files/charter/docs/charter_en.pdf

²⁰⁴ Green Paper 'Entrepreneurship in Europe', European Commission, COM (2003) 27 final, 21.01.2003.

http://ec.europa.eu/invest-in-research/pdf/download_en/entrepreneurship_europe.pdf

²⁰⁵ Available at <http://eur-lex.europa.eu>

²⁰⁶ Available at: <http://ec.europa.eu/enterprise/policies>

²⁰⁷ Report available at: http://ec.europa.eu/enterprise/policies/sme/files/entrepreneurship-2020/final-report-pub-cons-entr2020-ap_en.pdf

²⁰⁸ Available at: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2012:0795:FIN:EN:PDF>

1. Access to finance,
2. Support for entrepreneurs in the crucial phases of the business lifecycle and their growth,
3. Unleashing new business opportunities in the digital age,
4. Transfers of businesses,
5. Bankruptcy procedures and a second chance for honest entrepreneurs,
6. Regulatory burden reduction.

The third area was the one specifically dedicated to ICT and digital entrepreneurship.²⁰⁹

In line with the above commitments of the Commission, DG ENTR, which is responsible for the overall small business policy and the Entrepreneurship Action Plan, launched the Digital Entrepreneurship policy initiative. The report presents briefly one of the activities of this initiative: the Digital Entrepreneurship Monitor (DEM). DG CNECT started the Web Entrepreneurs policy initiative (often called Startup Europe).²¹⁰ The latter was explicitly created to complement the former. The report presents briefly some of the activities of the web entrepreneurs initiative through mapping projects such as the SEP Monitor – the Start up Europe Partnership Scale-Ups Mapping - or the Dynamic Mapping of web entrepreneurs and start-ups ecosystem.

Since, both initiatives, further described in the Annex 2, developed well beyond these activities.

3.2 The confusion between SMEs, newly created firms and Entrepreneurship policies

The EU policy framework and its initiatives are worth some comments in line with the earlier chapters of this report. The shift of political interest towards small companies, and even more towards the creation of new (and by nature small) companies has been observable and explicit since the late 90s.

As a reminder, the European Commission's Green paper on entrepreneurship (2003) states: "In the middle of the last century, economists predicted the dominance of large firms. Size was needed to obtain economies of scale, to exploit foreign markets and to keep abreast of regulations and of new opportunities in technology. (...). Since then, the trend has started to reverse. Large firms rationalised by restructuring, outsourcing or downsizing and the number of business owners in OECD countries increased from 29 million to 45 million between 1972 and 1998."²¹¹

Structural changes in the economy shifted Europe's comparative advantage towards knowledge-based activities. Globalisation increased competitive pressure on manufacturing firms in high-cost locations, which led not only to a shift in production capacity to low cost countries,²¹² but also to increasing productivity by using technological inputs. Meanwhile 'Information and Communication Technologies' (ICTs) gave rise to new markets, such as personal computers, software and ICT-based services, which revolutionised production processes in many industries and led to growth of the service sector." (European Commission, 2003).²¹³ Many academic authors see globalisation and technology as being the main explanations for this shift.

²⁰⁹ An extract of the text of Pillar 2, targeting digitalisation, is available in Annex 2.3.

²¹⁰ Details available at: <http://ec.europa.eu/digital-agenda/en/about-startup-europe>

²¹¹ Entrepreneurship: Determinants and policy in a European US comparison', David B. Audretsch et al., 2002.

²¹² Between 1991 and 1995, manufacturing employment in German plants decreased by 1 307 000 while it increased in foreign subsidiaries by 189 000, 'Entrepreneurship: A survey of the Literature', David B. Audretsch, October 2002.

²¹³ Available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52003DC0027>

But the shift is accompanied by some confusion about the target for policy making. EU policies have traditionally focused on SMEs, and more recently on (ICT) Entrepreneurship. As stated by the OECD (2011): "Policy references to entrepreneurship (a)re typically equated with small and medium sized enterprises (SMEs) in general or even numbers of self-employed. Neither of which fully captures the totality and complexity of entrepreneurship." (OECD, 2011). This conceptual choice has often affected empirical frameworks. The EU perspective, which does integrate entrepreneurship in SME policies, is reflected in the EUROSTAT data gathering work.²¹⁴

Theory expects to observe entrepreneurial activity in both small new companies and large corporations, and essential creative destruction to be fostered by both types of firm. Entrepreneurship is about innovation in any of these contexts. Digital entrepreneurship can occur with the creation of a new business, within an existing SME or within a large corporation.

DG ENTR is mainly concerned about the 20 million European SMEs that have limited technological absorption capacity and insufficient innovative performance. DG CNECT focuses on the emergence of a new generation of entrepreneurs in the ICT sector, concentrating on the population of start-ups and the conditions in which they emerge. The fate of large corporations seems to have been set aside, even though the DEM integrated them in its analysis. But clearly, both DGs are in need of better empirical evidence, as much as academia or industrial players.

3.3 Defining digital entrepreneurship

This report proposes a definition of digital entrepreneurship, in line with the joint OECD / EUROSTAT EIP work, which reflects the Schumpeterian approach to entrepreneurship.

We propose the following definitions:

- **Digital entrepreneurs** are those persons who seek to generate value, through the creation or expansion of economic activity, by identifying and exploiting new ICT or ICT-enabled products, processes and corresponding markets.²¹⁵
- **Digital entrepreneurial activity** is the enterprising human action in pursuit of the generation of value, through the creation or expansion of economic activity, by identifying and exploiting new ICT or ICT-enabled products, processes and corresponding markets.²¹⁶
- **Digital entrepreneurship** is the phenomenon associated with digital entrepreneurial activity.

While the expressions 'ICT entrepreneurship' and 'digital entrepreneurship' are widely used, we have opted to use only the expression '**digital entrepreneurship**' in this report as we believe it better reflects the fact that entrepreneurship exists both within and outside the ICT sector.²¹⁷

²¹⁴ EUROSTAT proposes a good overview of its initiatives related to SME and entrepreneurship policies with a focus on the data collection and analysis. See at:

http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Small_and_medium-sized_enterprises

²¹⁵ This definition is strongly inspired by the definition developed in the joint OEC-EUROSTAT EIP project. Nevertheless, it might be useful to note that since, the notion of innovation has been extended to organisation and marketing innovation (See for example the CIS, 2012). Such extended definition might show highly relevant in the case of Digital entrepreneurship.

²¹⁶ Same remark as above about a possible extension of the definition to organisation and marketing innovation.

²¹⁷ A possible alternative would have been to distinguish formally between "ICT entrepreneurship" *within* the ICT sector (sector taxonomy defined by the OECD), and "digital entrepreneurship" as encompassing all such activity *outside* the ICT sector. The option could even limit the use of ICT entrepreneurship to product innovation within the ICT sector. It is not the perspective taken in this report which, in addition, does not ambition to discuss such issues of taxonomy which are better assessed and decided within institutional contexts such as the OECD.

- digital entrepreneurship *within the ICT sector*, defined as the pursuit of the generation of value, through the creation or expansion of economic activity, by identifying and exploiting *new ICT* products, processes and markets.
- digital entrepreneurship *outside the ICT sector*, defined as the pursuit of the generation of value, through the creation or expansion of economic activity, by identifying and exploiting *new ICT-enabled* products, processes and markets.

The innovative dimension is seen here as largely, if not solely, ICT intensive, characterised by the production or by the use of ICT. The opportunities entrepreneurs need to seek, the Schumpeterian combinations they need to create, and the businesses they need to take responsibility and risk for, are in:

- the production of new ICT or ICT-enabled products (goods or services),
- the innovative use of ICT-enabled processes,
- the access to new markets for ICT or ICT-enabled products (goods or services).²¹⁸

3.4 Measuring digital entrepreneurship: the way forward

When it comes to measuring the above phenomenon, and assessing its determinants and impacts, the existing measurement frameworks appear to be deficient.

The report investigates the way three substantial features of digital entrepreneurship – innovation, ICT technology and intrapreneurship – are surveyed in several Entrepreneurship measurement or mapping frameworks. All of these, in one or another way, aim to collect empirical data about (ICT) entrepreneurship.

There is a wide range of definitions, purposes and methods in these tools. However, none of them allows us to measure digital entrepreneurship or analyse its determinants or impacts. This is due to the purposes that have guided the construction of the current frameworks: some extend the definition of entrepreneurship to the creation of any new business, others show no interest in technology, and very few consider intrapreneurship.

A data-driven analysis of digital entrepreneurship and its determinants needs to identify representative samples of innovative firms and gather company-level data to at least differentiate ICT-driven innovation from non ICT-driven innovation, and entrepreneurship from intrapreneurship. It also needs to collect information about a range of potential determinants and sufficient data to assess the economic impact of entrepreneurship at company, sector and macro-level. To serve European ambitions, it also calls for thorough geographical coverage.

Probably, additional characteristics would further help to describe the phenomena and interpret its evolution: location and clustering, globalisation and trade, knowledge sources and flows, etc.

Several existing measurement frameworks include very interesting features in their questionnaires and indicators. These frameworks could serve as the basis of a measurement framework targeting digital entrepreneurship and inspire its elaboration. The work developed within the Global Entrepreneurship Monitor (GEM) and the Global Entrepreneurship Index (GEDI) that of the Enterprise Survey of the World Bank and the experience gathered with the Community Innovation Survey of EUROSTAT have sufficient richness as to elaborate a tool in line with the Schumpeterian approach to entrepreneurship.

We recommend that the existing measurement frameworks should be used in the elaboration of a new and targeted tool for data collection and analysis of digital

²¹⁸ Same remark as above about a possible extension of the definition to organisation and marketing innovation.

entrepreneurship in support of the long-term conception, monitoring and evaluation of the European (ICT) entrepreneurship policy making.

From the information gathered while elaborating this report, three operational options have emerged:

1. An important body of surveys, analysis and researchers has grown up around the Global Entrepreneurship Monitor (GEM) and the Global Entrepreneurship Index (GEDI), which testifies to two decades of academic work and policy support. The resulting tools (surveys and expert analysis) and findings could offer direct support to an (ICT) Entrepreneurship policy at European or Member States level. The GEDI-REDI report (2013) takes a step forward in that direction with an analysis of entrepreneurship a NUTS 2 level, developed for DG REGIO. Horizon 2020 is probably the optimal framework for further adapting these existing theoretical and empirical frameworks to digital entrepreneurship, benefiting from past and current analysis. Various aspects of the Enterprise Survey of the World Bank and of the Community Innovation Survey of EUROSTAT could be included, and standardisation of concepts and measurement units should be an objective.
2. The Community Innovation Survey (CIS) is an iconic European survey, which explores innovation at firm level. It already serves several different purposes, and could further expand the range of its questions and some of its structural characteristics (panel) so that it could document empirically aspects relevant to digital entrepreneurship. Of course, this is a longer term objective as the CIS needs to result from a consensual approach of all European Member States and their National Statistical Institutes. Additionally, the CIS probably cannot serve the specific aim of exploring the determinants and impacts of (ICT) entrepreneurship. It is therefore seen as a difficult vehicle for the purpose explored in this report. Ultimately, as explained above, micro-data linking efforts could hopefully result in creating a relevant framework for analysis. This hypothesis should be carefully analysed before being acted upon: issues of access to anonymised data, cross-survey co-ordination and absence of panel data are just some of the obstacles to success.
3. Recently a range of initiatives have been undertaken to investigate the dynamics of ICT start-ups and their ecosystems. These initiatives could be specifically nurtured, as they have been, more than other measurement frameworks, designed ex-ante to focus on ICT. The problem here resides in how long these initiatives would take to produce a successful outcome.

The renewed political interest in entrepreneurship, and in digital entrepreneurship, calls for further empirical evidence. Past concepts, tools and analysis mainly addressed SMEs and business demographic issues, often leaving aside innovation, technology and in-house entrepreneurial activity.

Contemporary economic and political thinking urgently needs a better understanding of the nexus entrepreneurship / ICT-enabled innovation / economic growth. Europe must establish a tool that allows evidence of this kind to be gathered, analysed and delivered to policy makers.

Annex 1: Entrepreneurship - Measurement frameworks

This Annex describes briefly the main measurements framework used to collect empirical data regarding entrepreneurship.

The following sources of data are briefly presented:

- 1.1 The Entrepreneurship Indicators Programme - EIP
- 1.2 The EIP Demography Statistics
- 1.3 Global Entrepreneurship Monitor – GEM
- 1.4 The Regional Entrepreneurship and Development Index - REDI
- 1.5 The Community Innovation Survey - CIS
- 1.6 Digital Entrepreneurship Monitor - DEM
- 1.7 Enterprise Surveys (World Bank Group)
- 1.8 The Global Entrepreneurship & Development Index - GEINDEX
- 1.9 Doing Business (World Bank Group)
- 1.10 EU Flash Barometer Survey on Entrepreneurship
- 1.11 Panel Study of Entrepreneurial Dynamics – PSED
- 1.12 The comparative entrepreneurship data for international analysis – COMPENDIA

The Annex starts with those initiatives that have shown to be most relevant to the topic of this report, being them based on official statistics (data from National Statistical Institutes of participating countries) or not.

It is important to pay attention to the distinctive theoretical backgrounds, definitions, objectives and units of analysis of each measurement framework. Most of such information is usually made public and sometimes organised in a Metadata chapter.

Those frameworks also differentiate themselves by the dimensions they try to capture. The focus might be on:

- the determinants of entrepreneurship (upstream factors influencing the development of entrepreneurship)
- the entrepreneurship performance (measuring the intensity of entrepreneurship)
- the impact of entrepreneurship (measuring the effects of entrepreneurship upon i.e. the economy).

In all cases, the Annex tries to indicate complementary sources of information for the interested reader.

Annex 1.1: The Entrepreneurship Indicators Programme: EIP²¹⁹

General description

The Entrepreneurship Indicators Programme (EIP) was launched in September 2006 as a joint OECD/EUROSTAT project, and operational since 2011, is the largest consensual public effort for measuring entrepreneurship dynamics through official statistics on business demography, both within EU member states and outside the EU.

It aims at developing policy-relevant and internationally-comparable indicators, based on an analytical model and measurement infrastructure that allow gathering harmonised and comparable data across countries. The Programme has initially produced methodological tools to structure the development and collection of indicators of entrepreneurship: the "[Eurostat-OECD Manual on Business Demography Statistics \(2007\)](#)", and the Working Papers "[Defining Entrepreneurial Activity: Definitions Supporting Frameworks for Data Collection \(2008\)](#)" and "[A Framework for Addressing and Measuring Entrepreneurship \(2008\)](#)".

Since 2011, the yearly publication "Entrepreneurship at a Glance" presents the actual collection of core indicators of entrepreneurial performance, as well as a selection of indicators of entrepreneurial determinants. Until then, states the OECD, most entrepreneurship research relied on ad hoc data compilations developed to support specific projects and virtually no official statistics on the subject existed. The collection of harmonised indicators presented in this publication and started in 2006 is a unique attempt to compile and publish international data on entrepreneurship from official government statistical sources.

The measurement framework

The EIP takes a comprehensive approach to the measurement of entrepreneurship by looking not only at the manifestation of the entrepreneurial phenomenon but also at the factors that influence it. Within the EIP, entrepreneurship performance is measured in terms of firm demographics, employment effects and wealth effects. Upstream determinants are expected to induce those impacts.

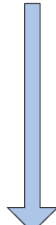
The programme recognises that no single indicator can ever adequately cover entrepreneurship, and it has therefore developed a set of measures that each captures a different aspect or type of entrepreneurship. There are currently some 20 performance indicators and dozens of determinants indicators covered in the EIP.

These factors range from the market conditions to the regulatory framework, to the culture or the conditions of access to finance. While some areas of determinants lend themselves more readily to measurement (for instance, the existence and restrictiveness of anti-trust laws or the administrative costs of setting-up a new business in a country), for other determinants the difficulty resides in finding suitable measures (e.g. venture capital and angel capital) and/or in comprehending the exact nature of their relationship with entrepreneurship (e.g. culture). An important objective of the EIP in this instance is to contribute to and advance research on the less understood and less measurable determinants of entrepreneurship.

The following scheme (OECD, 2013) details the components for each family of indicators as well as the theoretical links between determinants, performance and impacts of entrepreneurship.

²¹⁹ Most of the information compiled here can be found at: <http://www.oecd.org/industry/business-stats/theentrepreneurshipindicatorsprogrammeeipbackgroundinformation.htm>

Entrepreneurship Indicators Programme Indicators framework

Determinants						Entrepreneurial performance	Impact	
Regulatory framework	Market conditions	Access to finance	Knowledge creation and diffusion	Entrepreneurial capabilities	Culture	Firm based	Job creation	
Administrative burdens for entry	Anti-trust laws	Access to debt financing	R&D investment	Training and experience of entrepreneurs	Risk attitude in society	Employment based	Economic growth	
Administrative burdens for growth	Competition	Business angels	University/industry interface	Business and entrepreneurship education (skills)	Attitudes towards entrepreneurs	Wealth	Poverty reduction	
Bankruptcy regulations	Access to the domestic market	Access to VC	Technological co-operation between firms	Entrepreneurship infrastructure	Desire for business ownership		Formalising the informal sector	
Safety, health and environmental regulations	Access to foreign markets	Access to other types of equity	Technology diffusion	Immigration	Entrepreneurship education (mindset)			
Product regulation	Degree of public involvement	Stock markets	Broadband access					
Labour market regulation	Public procurement							
Court and legal framework								
Social and health security								
Income taxes; wealth/bequest taxes								
Business and capital taxes	Patent system; standards							
						Firms	Employment	Wealth
						Employer enterprise birth rates	Share of high growth firms (by employment)	Share of high growth firms (by turnover)
						Employer enterprise death rates	Share of gazelles (employment)	Share of gazelles (by turnover)
						Business churn	Ownership rate start-ups	Value added, young or small firms
						Net business population growth	Ownership rates business population	Productivity contribution, young or small firms
						Survival rates at 3 and 5 years	Employment in 3 and 5 year old firms	Innovation performance, young or small firms
						Proportion of 3 and 5 year old firms	Average firm size after 3 and 5 years	Export performance, young or small firms

Source: OECD, 2013.

In some other versions published likewise by the OECD, the above framework varies slightly but its overall structure and details stay rather similar'. For example, employment, value added and productivity can be measured by size-class or a special focus can be given to migrants or gender-related numbers.

The OECD presents a comprehensive list of indicators of entrepreneurial determinants.²²⁰ The list draws from the reports "[Quality Assessment of Entrepreneurship Indicators](#)", prepared by FORA (2006). Indicators are classified into the six categories of determinants set by the OECD-Eurostat Entrepreneurship Indicators Programme (EIP).

While many critical factors affecting entrepreneurship are covered by these indicators, the list should not be considered as exhaustive, says the OECD. On the one side, the selection of indicators reflects the current availability of data, meaning that important indicators may be missing, for instance in the determinant area "access to finance", just because no source of international data was found. On the other side, research on entrepreneurship is still young, especially on topics such as the relationship between culture and entrepreneurship, with the result that appropriate indicators are yet to be identified. The detailed list of indicators (2011) and their sources are listed within the links below.

²²⁰ Source: <http://www.oecd.org/industry/business-stats/indicatorsofentrepreneurialdeterminants.htm>

1. Regulatory Framework

<http://www.oecd.org/industry/business-stats/48129925.pdf>

2. Market conditions

<http://www.oecd.org/industry/business-stats/48129943.pdf>

3. Access to finance

<http://www.oecd.org/industry/business-stats/48129986.pdf>

4. Creation and diffusion of knowledge

<http://www.oecd.org/industry/business-stats/48130004.pdf>

5. Entrepreneurial capabilities

<http://www.oecd.org/industry/business-stats/48130028.pdf>

6. Entrepreneurship culture

<http://www.oecd.org/industry/business-stats/48130046.pdf>

Main outputs

All measurement results are available in the annual OECD reports Entrepreneurship at a Glance.²²¹

The most important publications that have inspired the EIP project are the following:

- FORA, 2006. Quality Assessment of Entrepreneurship Indicators, Version 2. International Consortium for Dynamic Benchmarking of Entrepreneurship. The National Agency for Enterprise and Construction's Division for Research and Analysis. Denmark.

Available at: http://erhvervsstyrelsen.dk/file/7323/Qualitymanual_.pdf

- OECD (2006). Understanding Entrepreneurship: developing indicators for international comparisons and assessments. Report on the OECD's Entrepreneurship Indicators Project and Action Plan, OECD Publishing.

Available at:

<http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?doclanguage=en&cote=STD/CSTAT%282006%299>

- European Communities, OECD (2007). Eurostat – OECD Manual on Business Demography Statistics (Ed.2007)

Available at: http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-RA-07-010/EN/KS-RA-07-010-EN.PDF

- OECD, 2007. A Framework for Addressing and Measuring Entrepreneurship by Nadim Ahmad and Anders Hoffman. OECD paper presented at the Entrepreneurship Indicators Steering Group. Available at: <http://www.oecd.org/industry/business-stats/39629644.pdf>

- OECD (2008). Defining Entrepreneurial Activity: Definitions Supporting Frameworks for Data Collection. OECD Statistics Working Papers, 2008/01, OECD Publishing.

Available at: <http://dx.doi.org/10.1787/243164686763>.

²²¹ OECD (2011), Entrepreneurship at a Glance, OECD Publishing: <http://dx.doi.org/10.1787/9789264097711-en>

OECD (2012), Entrepreneurship at a Glance, OECD Publishing: http://www.oecd-ilibrary.org/industry-and-services/entrepreneurship-at-a-glance-2012_entrepreneur_aag-2012-en

OECD (2013), Entrepreneurship at a Glance, OECD Publishing: http://dx.doi.org/10.1787/entrepreneur_aag-2013-en

Annex 1.2: The EIP Demography Statistics²²²

General description

Business demography provides information for births, deaths and survival rates of enterprises, as well as information on related employment data. The two main measures used for employment are the number of persons employed and the number of employees.

The demography of the business population is represented by data on:

- the active population of enterprises;
- their birth;
- their survival (followed up to five years after birth);
- their death.

Particular attention is paid to the impact that these demographic events have on employment levels. Business demography data can be used to analyse the dynamics and innovation of different markets, such as:

- entrepreneurship in terms of the propensity to start a new business, such as analysed in the joint OECD/Eurostat Entrepreneurship Indicators Programme;
- how newly-born enterprises can contribute to the creation of jobs.

The measurement framework

Business demography data has been collected since 2002. Currently 25 countries participate in the data collection exercise. After the recently adopted amendment of the SBS Regulation, the business demography data collection has become part of the regular annual collection of structural business statistics.

The basic variables are:

- Population of active enterprises in t
- Number of births of enterprises in t
- Number of deaths of enterprises in t
- Number of enterprises newly born in t-1 having survived to t
- Number of enterprises newly born in t-2 having survived to t
- Number of enterprises newly born in t-3 having survived to t
- Number of enterprises newly born in t-4 having survived to t
- Number of enterprises newly born in t-5 having survived to t
- Number of high growth enterprises measured in employment
- Number of high growth enterprises measured in turnover
- Number of gazelles measured in employment
- Number of gazelles measured in turnover
- Number of persons employed in the population of births in t
- Number of employees in the population of births in t
- Number of persons employed in the population of deaths in t

²²² See at:
http://epp.eurostat.ec.europa.eu/portal/page/portal/european_business/special_sbs_topics/business_demography

- Number of employees in the population of deaths in t
- Number of persons employed in the population of enterprises newly born in t-1 having survived to t
- Number of persons employed in the population of enterprises newly born in t-2 having survived to t
- Number of persons employed in the population of enterprises newly born in t-3 having survived to t
- Number of persons employed in the population of enterprises newly born in t-4 having survived to t
- Number of persons employed in the population of enterprises newly born in t-5 having survived to t
- Number of persons employed in the year of birth in the population of enterprises newly born in t-1 having survived to t
- Number of persons employed in the year of birth in the population of enterprises newly born in t-2 having survived to t
- Number of persons employed in the year of birth in the population of enterprises newly born in t-3 having survived to t
- Number of persons employed in the year of birth in the population of enterprises newly born in t-4 having survived to t
- Number of persons employed in the year of birth in the population of enterprises newly born in t-5 having survived to t
- A number of derived indicators have also been proposed by EUROSTAT.²²³

The Business statistics introduce to additional categorisations of firms, which often compete with existing views and definitions about Entrepreneurship. It is probably useful to present here their formal definitions as in EUROSTAT Metdata.

High-Growth Enterprises (growth by 10% or more)

Commission implementing regulation (EU) No 439/2014 set the definitions of characteristics on high-growth enterprises with at least 10 employees in the beginning of their growth and having average annualised growth in number of employees greater than 10% per annum, over a three year period.

High-Growth Enterprises and Gazelles (growth by 20% or more)

The definitions of the concepts used in these datasets are laid down in the Eurostat-OECD Manual on Business Demography Statistics. All enterprises with average annualised growth greater than 20% per annum, over a three year period should be considered as high-growth. Growth can be measured by the number of employees or by turnover. Medium growth enterprises are defined with the average annualised growth mentioned above between 10 and 20%.

In addition, data are collected on so-called 'gazelles', i.e. high-growth enterprises that are up to five years old. All enterprises up to five years old with average annualised growth greater than 20% per annum, over a three year period, should be considered as gazelles. Those medium growth enterprises which are up to five years old are called young medium growth enterprises.

As the growth factor defining high growth does not depend on the size of the enterprise, a meaningful threshold has to be set. Otherwise, for instance, a small enterprise growing from 1 to 2 employees over three years would already be considered as a 'high growth

²²³ Available at: http://epp.eurostat.ec.europa.eu/cache/ITY_SDDS/Annexes/bd_esms_an1.pdf

enterprise'. Thus, a threshold of 10 employees (up to the reference year 2006) / 5 or 10 employees (the reference year 2007 onwards) is applied, i.e. only those enterprises that had at least 5 or 10 employees at the beginning of the three-year observation period are covered.

Main outputs

Data and main publications are available at:

http://epp.eurostat.ec.europa.eu/portal/page/portal/european_business/special_sbs_topics/business_demography

Important references for Business statistics are:

- Eurostat – OECD Manual on Business Demography Statistics:
http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-RA-07-010/EN/KS-RA-07-010-EN.PDF
- Reference Metadata:
http://epp.eurostat.ec.europa.eu/cache/ITY_SDDS/en/bd_esms.htm#annex1405676485738
- Business Demography Indicators:
http://epp.eurostat.ec.europa.eu/cache/ITY_SDDS/Annexes/bd_esms_an1.pdf

Annex 1.3 Global Entrepreneurship Monitor - GEM²²⁴

General description

"Seeking to provide internationally comparable data on entrepreneurial activity (Reynolds et al. 1999, 2005), researchers at Babson College (USA) and London Business School (UK) created the Global Entrepreneurship Monitor (GEM) in 1999. The purpose of the GEM project is to use empirical data to assess the level of entrepreneurial activity across countries, to understand how entrepreneurial activity varies over time, and to understand why some countries are more entrepreneurial than others. In addition, GEM researchers seek to explore the relationship between entrepreneurial activity and economic growth and identify which public policies boost entrepreneurship." (Alvarez et al., 2014)

The Global Entrepreneurship Monitor (GEM) project is an annual assessment of the entrepreneurial activity, aspirations and attitudes of individuals across a wide range of countries. Initiated in 1999 as a partnership between London Business School and Babson College, the first study covered 10 countries; since then nearly 100 'National Teams' have participated in the project, which continues to grow annually. The project has an estimated global budget of nearly USD \$9 million; the 2013 survey is set to cover 75% of world population and 89% of world GDP.

"Since its inception, GEM has sought to explore the widely accepted link between entrepreneurship and economic development (Carree and Thurik, 2003; Acs, 2006; Audretsch 2007). (...) To understand this central aim, GEM defines a conceptual model that sets out key elements of the relationship between entrepreneurship and economic growth and the way in which the elements interact. It takes as its starting point the recognition that while other scholars had defined the general national framework conditions for established enterprise to thrive (Schwab and Schwartz, 1997), a different set of "entrepreneurial framework conditions" (EFCs) and both entrepreneurial capacity and entrepreneurial opportunities were needed to enable new business activity. The generation of the first set of nine EFCs drew not only on an extensive literature review of entrepreneurship and economic growth, but also on the collective inputs of a group of scholars who were based at London Business School in 1997/1998." (Bosma et al., 2012)

GEM was established with the following objectives:

- To measure differences in entrepreneurial attitudes, activity and aspirations of individuals among as many economies across the globe
- To uncover factors determining the nature and levels of entrepreneurial activity, and
- To identify policy implications for enhancing entrepreneurship in an economy.

For the purpose of this report, it is important to note that the GEM project covers currently all European Member States, with the exception of Bulgaria.

3.2 The measurement framework

The framework of GEM is illustrated in the following scheme, which is a revised version (2012) of the original one. This revised model is founded on the concept that the contribution of entrepreneurs to an economy varies according to its phase of economic development (Wennekers et al., 2005; Gries and Naude, 2008), and on the realization that the Global Competitiveness Index, on which the model drew for its General National Framework Conditions, had evolved considerably since the late 1990s. The revised model introduced a more nuanced distinction between phases of economic development,

²²⁴ See at: <http://www.gemconsortium.org/>

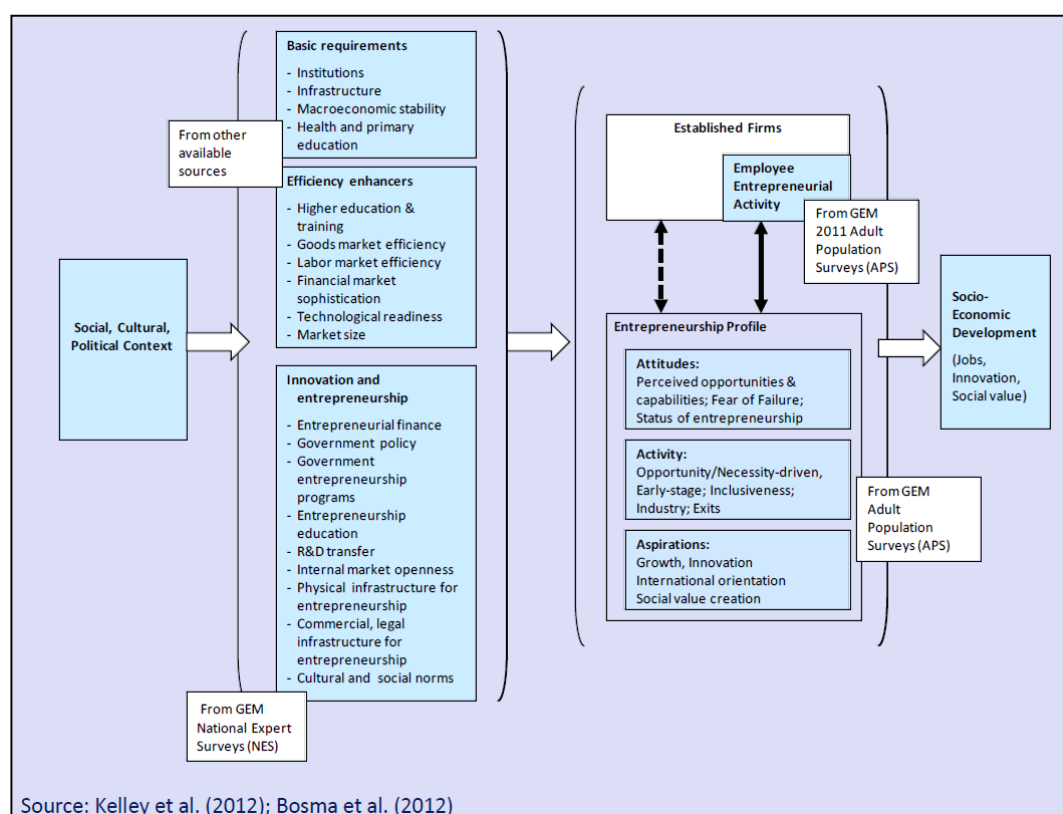
in line with Porter's typology of "factor-driven economies", "efficiency-driven economies" and "innovation-driven economies" (Porter et al., 2002), and recognized that GEM's unique contribution was to describe and measure, in detail, the conditions under which entrepreneurship and innovation can thrive.

Contributing to the framework, "(T)hree main components (...) capture the multi-faceted nature of entrepreneurship: entrepreneurial attitudes, entrepreneurial activity, and entrepreneurial aspirations. They are presented in the model as components of a "black box" that contributes to innovation and jobs in an economy, but how they affect and reinforce each other is not spelled out in detail. This ambiguity was deliberate; it reflected the view that all three elements may affect each other rather than being components of a linear process and it was expected that further theoretical and empirical work would open up this black box. While the first model included capability and opportunity, it was never clear – and scholars still dispute – whether these are objective realities or subjective constructs, and aspiration was notably absent from the model. Aspiration is relevant because researchers increasingly realize that all entrepreneurial activity does not equally contribute to development. For example, in many countries, much employment creation comes from a small number of ambitious, fast-growing new businesses (Autio, 2007)." (Bosma et al., 2012)

The scheme also indicates the two data gathering instruments GEM has developed and maintained across years at a global level, as well as their differentiated role: the National Experts Survey and the Adult Population Survey. The two survey components of GEM, the Adult Population Survey and the National Expert Survey are distinct but complementary; the resultant data provides an insight into the entrepreneurial ecosystem of a country.

Data collected as part of the GEM Adult Population Survey (APS) is used to produce indicators which measure the entrepreneurial activity, attitudes and aspirations of individuals. Here, the main guiding purpose of GEM is to measure individual involvement in venture creation by tracking which types of people are (and are not) participating in entrepreneurship, formally registering businesses and those running informal ones. GEM also assesses the motives and aspirations of entrepreneurs as well as the attitudes representing the climate for entrepreneurship in a society.

Global Entrepreneurship Monitor Indicators framework



The indicators of the GEM Adult Population Survey (APS) are the following:²²⁵

1. Entrepreneurial activity

Established Business Ownership Rate

Improvement-Driven Opportunity Entrepreneurial Activity: Relative Prevalence

Informal Investors Rate

Nascent Entrepreneurship Rate

Necessity-Driven Entrepreneurial Activity: Relative Prevalence

New Business Ownership Rate

Total early-stage Entrepreneurial Activity (TEA)

Total early-stage Entrepreneurial Activity for Male Working Age Population

Total early-stage Entrepreneurial Activity for Female Working Age Population

2. Entrepreneurial aspirations

Growth Expectation early-stage Entrepreneurial Activity: Relative Prevalence

New Product early-stage Entrepreneurial Activity

International Orientation early-stage Entrepreneurial Activity

3. Entrepreneurial attitude

Entrepreneurial Intention

²²⁵ For the detailed definition of each indicator, see at: <http://www.gemconsortium.org/docs/download/414>

Entrepreneurship as Desirable Career Choice

Fear of Failure Rate

High Status Successful Entrepreneurship

Know Start-up Entrepreneur Rate

Media Attention for Entrepreneurship

Perceived Capabilities

Perceived Opportunities

Data collected as part of the GEM National Expert Survey (NES) enables the measurement of factors that impact national entrepreneurial activity. The 9 Entrepreneurial Framework Conditions (EFCs) are:

1. **Finance:** The availability of financial resources— equity and debt—for small and medium enterprises (SMEs) (including grants and subsidies).
2. **Government policies:** The extent to which taxes or regulations are either size-neutral or encourage SMEs.
3. **Government programmes:** The presence and quality of direct programmes to assist new and growing firms at all levels of government (national, regional, municipal).
4. **Entrepreneurial education and training:** The extent to which training in creating or managing SMEs is incorporated within the education and training system at all levels (primary, secondary and post-school).
5. **R&D transfer:** The extent to which national research and development will lead to new commercial opportunities and is available to SMEs.
6. **Commercial and professional infrastructure:** The presence of property rights and commercial, accounting, and other legal services and institutions that support or promote SMEs.
7. **Entry regulation:** Contains two components: (1) Market Dynamics: the level of change in markets from year to year, and (2) Market Openness: the extent to which new firms are free to enter existing markets.
8. **Physical infrastructure and services:** Ease of access to physical resources— communication, utilities, transportation, land or space—at a price that does not discriminate against SMEs.
9. **Cultural and social norms:** The extent to which social and cultural norms encourage or allow actions leading to new business methods or activities that can potentially increase personal wealth and income.

Main outputs

The GEM project has currently produced 15 annual Global reports (all available at : <http://www.gemconsortium.org/docs/cat/1/global-reports>),²²⁶ some hundreds of national and topic reports respectively available at <http://www.gemconsortium.org/docs/cat/4/national-reports/page/53> and <http://www.gemconsortium.org/docs/cat/2/special-topic-reports>.

Data is made available at: <http://www.gemconsortium.org/Data>

²²⁶ Recent global measurement results: GEM 2013 Global Report, authored by Jose Ernesto Amoros, Niels Bosma. Available at <http://www.gemconsortium.org/docs/3106/gem-2013-global-report>
GEM 2012 Global Report, authored by Siri Roland Xavier, Donna Kelley, Jacqui Kew, Mike Herrington, Arne Vorderwülbecke. Available at: <http://www.gemconsortium.org/docs/2645/gem-2012-global-report>
GEM 2011 Global Report, authored by Donna J. Kelley, Slavica Singer, Mike Herrington. Available at: <http://www.gemconsortium.org/docs/2409/gem-2011-global-report>

The most important publications around the GEM project are the following:

- Reynolds, P., Bosma, N., Autio, E., Hunt, S., De Bono, N., Servais, I., Lopez-Garcia P., & Chin, N. (2005). Global Entrepreneurship Monitor: Data collection design and implementation 1998-2003. *Small Business Economics*, 24(3), 205-231.
- Levie, J., & Autio, E. (2008). A theoretical grounding and test of the GEM model. *Small Business Economics*, 31(3).
- The 2011 APS questionnaire: <http://www.gemconsortium.org/docs/2594/gem-2011-aps-questionnaire>
- The National Expert Survey (NES) : not available on internet
- Niels Bosma, Alicia Coduras, Yana Litovsky and Jeff Seaman, 2012. GEM Manual. A report on the design, data and quality control of the Global Entrepreneurship Monitor. <http://www.gemconsortium.org/docs/download/2375>

Annex 1.4: The Global Entrepreneurship and Development Index – GEDI / GEINDEX²²⁷

General description

The Global Entrepreneurship and Development Index was created around 2010 "to provide a more complete understanding of economic development by capturing the contextual nature of business formation, expansion, and growth". Its authors claim that it is based on the analysis of comprehensive data sets that marshal information about the "3A's" of development: entrepreneurial attitudes, aspirations, and activity. It covers today over 70 countries.

The GEINDEX is developed by two eminent authors of entrepreneurship studies, Zoltan J. Acs & Laszlo Szerb. It assesses and analyses entrepreneurship at national level

The measurement framework²²⁸

The index builds on as to improve earlier measures by capturing quantitative and qualitative aspects of entrepreneurship.

The structure of the GEDI is as following:

GLOBAL ENTREPRENEURSHIP AND DEVELOPMENT INDEX			
Pillars	Entrepreneurial Aspirations Sub-Index		Variables
	Entrepreneurial Abilities Sub-Index		
Entrepreneurial Aspirations Sub-Index	Risk Capital	Informal Investment	Depth of Capital Market
	Internationalization	Export	Globalization
Entrepreneurial Abilities Sub-Index	High Growth	Gazelle	Business Strategy
	Process Innovation	New Tech	GERD
Entrepreneurial Attitudes Sub-Index	Product Innovation	New Product	Technology Transfer
	Competition	Competitors	Market Dominance
Entrepreneurial Attitudes Sub-Index	Human Capital	Educational Level	Staff Training
	Technology Absorption	Technology Level	Tech Absorption
Entrepreneurial Attitudes Sub-Index	Gender	Female Opportunity	TEA Femalr
	Opportunity Start-up	Opportunity Motivation	Freedom
Entrepreneurial Attitudes Sub-Index	Cultural Support	Career Status	Corruption
	Networking	Know Entrepreneurs	Internet Usage
Entrepreneurial Attitudes Sub-Index	Risk Acceptance	Risk Acceptance	Business Risk
	Start-up Skills	Skill Perception	Tertiary Education
Entrepreneurial Attitudes Sub-Index	Opportunity Perception	Opportunity Recognition	Market Agglomeration

(Note: The GEDI is a super-index made up of three sub-indices, each of which is composed of several pillars. Each pillar consists of an institutional variable (denoted in bold) and an individual variable (denoted in bold/italic). The data values for each variable are gathered from a wide range of sources.)

²²⁷ <http://www.thegedi.org/>

²²⁸ This text is largely sourced from Acs, Szerb, 2010.

It measures entrepreneurial performance over three sub-indexes, 14 pillars, and 31 individual and institutional variables. (Acs, Szerb. 2010)

*"The variables can be at the individual level (personal or business) or institutional level. All individual-level variables are from the GEM Adult Population Survey. The institutional variables are obtained from various sources, like the World Economic Forum, The Heritage Foundation, Coface, etc. The GEINDEX calculate(s) all pillars or indicators from the variables using the interaction variable method; that is, by multiplying the individual variable with the proper institutional variable. The indicators are the basic building blocks of the sub-index: entrepreneurial attitudes, entrepreneurial activities, and entrepreneurial aspirations. The PFB method calculates the three sub-indexes from the indicators. Finally, the super-index, the GEINDEX, is simply the average of the three sub-indexes."*²²⁹

For the first sub-index, entrepreneurial attitudes are defined as the general disposition of a country's population toward entrepreneurs, entrepreneurship, and business start-ups. The index involves measures for the population's opportunity perception potential, the perceived start-up skills, feel or fear of failure, networking prospects, and cultural respect for the entrepreneur.

For the second sub-index, entrepreneurial activity is defined as the start-up activity in the medium- or high-technology sector initiated by educated entrepreneurs in response to business opportunities in a somewhat competitive environment.

The third sub-index, entrepreneurial aspiration, is defined as the efforts of the early stage entrepreneur to introduce new products and services, develop new production processes, penetrate foreign markets, substantially increase the number of firm employees, and finance the business with either formal or informal venture capital, or both.

The individual variables used in GEDI are:²³⁰

- **OPPORTUNITY** The percentage of the 18-64 aged population recognizing good conditions to start business next 6 months in area he/she lives.
- **SKILL** The percentage of the 18-64 aged population claiming to possess the required knowledge/skills to start business.
- **NONFAIRFAIL** The percentage of the 18-64 aged population stating that the fear of failure would not prevent starting a business.
- **KNOWENT** The percentage of the 18-64 aged population knowing someone who started a business in the past 2 years.
- **NBGOODAV** The percentage of the 18-64 aged population saying that people consider starting business as good carrier choice.
- **NBSTATAV** The percentage of the 18-64 aged population thinking that people attach high status to successful entrepreneurs.
- **CARSTAT** The status and respect of entrepreneurs calculated as the average of NBGOODAV and NBSTATAV.
- **TEAOPPORT** Percentage of the TEA businesses initiated because of opportunity start-up motive.
- **TECHSECT** Percentage of the TEA businesses that are active in technology sectors (high or medium).

²²⁹ Source: http://www.thegedi.org/wp-content/uploads/2011/05/Acs_en_Szerb_GEINDEX_Netherlands1.pdf

²³⁰ The full list of indicators is detailed with their sources in p.17-18 of Acs, Szerb, 2010. Available at: <http://www2.druid.dk/conferences/viewpaper.php?id=502261&cf=43>

- HIGHEDUC Percentage of the TEA businesses owner/managers having participated over secondary education.
- COMPET Percentage of the TEA businesses started in those markets where not many businesses offer the same product.
- NEWP Percentage of the TEA businesses offering products that are new to at least some of the customers.
- NEWT Percentage of the TEA businesses using new technology that is less than 5 years old average (including 1 year).
- GAZELLE Percentage of the TEA businesses having high job expectation average (over 10 more employees and 50% in 5 years).
- EXPORT Percentage of the TEA businesses where at least some customers are outside country (over 1%).
- INFINVMEAN The mean amount of 3 year informal investment.
- BUSANG The percentage of the 18-64 aged population who provided funds for new business in past 3 years excluding stocks & funds, average.
- INFINV The amount of informal investment calculated as $\text{INFINVMEAN} * \text{BUSANG}$.

The institutional variables used in GEDI are:²³¹

- MARKETDOM Domestic market size that is the sum of gross domestic product plus value of imports of goods and services, minus value of exports of goods and services, normalized on a 1–7.
- URBANIZATION. Urbanization that is the percentage of the population living in urban areas.
- MARKETAGGLOM The size of the market: A combined measure of the domestic market size and the urbanization that later measures the potential agglomeration effect.
- EDUCPOSTSEC Gross enrolment ratio in tertiary education, 2008 or latest available data
- BUSINESS RISK The business climate rate “assesses the overall business environment quality in a country... It reflects whether corporate financial information is available and reliable, whether the legal system provides fair and efficient creditor protection, and whether a country's institutional framework is favourable to intercompany transactions”.
- INTERNETUSAGE The number Internet users in a particular country per 100 inhabitants.
- CORRUPTION The Corruption Perceptions Index (CPI) measures the perceived level of public-sector corruption in a country.
- FREEDOM “Business freedom is a quantitative measure of the ability to start, operate, and close a business that represents the overall burden of regulation, as well as the efficiency of government in the regulatory process.
- TECHABSORP Firm level technology absorption capability: “Companies in your country are able to absorb new technology”.
- STAFFTRAIN The extent of staff training: “To what extent do companies in your country invest in training and employee development?”

²³¹ The full list of indicators is detailed with their sources in p.17-18 of Acs, Szerb, 2010. Available at: <http://www2.druid.dk/conferences/viewpaper.php?id=502261&cf=43>

- MARKDOM Extent of market dominance: "Corporate activity in your country is dominated by a few business groups.
- GERD Gross domestic expenditure on Research & Development (GERD) as a percentage of GDP.
- INNOV Innovation index points from GCI: a complex measure of innovation including investment in research and development (R&D) by the private sector, the presence of high-quality scientific research institutions, the collaboration in research between universities and industry, and the protection of intellectual property.
- BUSS STRATEGY Refers to the ability of companies to pursue distinctive strategies, which involves differentiated positioning and innovative means of production and service delivery.
- GLOB A part of the Globalization Index measuring the economic dimension of globalization. The variable involves the actual flows of trade, Foreign Direct Investment, portfolio investment and income payments to foreign nationals as well as restrictions of hidden import barriers, mean tariff rate, taxes on international trade and capital account restrictions.
- VENTCAP A measure of the venture capital availability on a 7-point Likert scale generating from a statement: Entrepreneurs with innovative but risky projects can generally find venture capital in your country.

Main outputs

The main public outputs are, on the one hand the annual Global Entrepreneurship and Development Index reports, and on the other hand, nation-specific ones such as: , a report on the US and another on the Netherlands.²³²

Major publications that have inspired the GEINDEX project are the following:

- Acs, Z.J. and L. Szerb (2009). The global entrepreneurship Index (GEINDEX), Foundations and Trends in entrepreneurship. <http://www.nowpublishers.com/articles/foundations-and-trends-in-entrepreneurship/ENT-027>
- Acs, Z. J and L. Szerb (2010.) The Global Entrepreneurship and Development Index. There are versions of 2010 up to 2014.
- Acs, Z.J. and L. Szerb (2011). The Global Entrepreneurship and Development Index Methodology.

²³² Respectively at http://www.thegedi.org/wp-content/uploads/2011/05/SBA_Gedi1.pdf and http://www.thegedi.org/wp-content/uploads/2011/05/Acs_en_Szerb_GEINDEX_Netherlands1.pdf

Annex 1.5: The Regional Entrepreneurship and Development Index (REDI)²³³

General description

THE REDI is a report inspired by the earlier experience of the Global Entrepreneurship Monitor (GEM) and of the Global Entrepreneurship Index (GEDI), developed by an eminent set of academic researchers, including again Zoltan J. Acs & Laszlo Szerb, from University of Groningen (The Netherlands), Imperial College London (UK), University of Pécs, Hungary and Utrecht University (The Netherlands).

The Regional Entrepreneurship and Development Index (REDI) claims to develop a fresh approach to measuring entrepreneurship in EU regions, considering that a systemic understanding of entrepreneurship dynamics in countries and regions remains in its infancy. It states that the great bulk of both theorizing and empirical research on entrepreneurship has focused on the individual and the firm and ignored the study of the context within which these are embedded, this in spite of the widespread recognition that entrepreneurs do not operate in isolation from their contexts.

Hence this report builds on theoretical developments towards a systemic perspective to entrepreneurship in regions to develop an empirical and normative elaboration of the 'Systems of Entrepreneurship' phenomenon, arguing that a systemic approach is particularly important for policy, because policy initiatives address typically system-level gaps and shortcomings.

The measurement framework

REDI is a final index made up of three sub-indices, each of which is composed of several pillars. Each pillar consists of an institutional variable and an individual variable.

The overall structure of REDI is as following:

²³³ See at:
http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/regional_entrepreneurship_development_index.pdf

REGIONAL ENTREPRENEURSHIP AND DEVELOPMENT INDEX														
Entrepreneurial Attitudes Sub-Index					Entrepreneurial Abilities Sub-Index					Entrepreneurial Aspirations Sub-Index				
Pillars														
Financing					Globalization					High Growth				
Process Innovation					Product Innovation					Technology Adoption				
Human Capital					Competition					Opportunity Startup				
Cultural Support					Networking					Risk Acceptance				
Start-up Skills					Opportunity Perception					Business Environment				
Variables														
Informal Investment					Financial Institutions					Export				
Connectivity					Gazelle					Clustering				
New Tech Development					New Product Technology Transfer					Competitors				
Business Strategy					Educational Level					Education and Training				
Technology Level					Absorption Capacity					Opportunity Motivation				
Business Environment					Career Status					Open society				
Know Entrepreneurs					Social Capital					Risk Acceptance				
Business Risk					Skill Perception					Quality of Education				
Opportunity Recognition					Market					Aviation				
Aviation					Aviation					Aviation				

All individual-level variables except two are from the GEM survey.

Individual variables and indicators used in the REDI

Individual variable	Description	Source of data
<i>Opportunity Recognition</i>	The percentage of the 18-64 aged population recognizing good conditions to start business next 6 months in area he/she lives,	GEM 2007-2011
<i>Skill Perception</i>	The percentage of the 18-64 aged population claiming to possess the required knowledge/skills to start business	GEM 2007-2011
<i>Risk Acceptance</i>	The percentage of the 18-64 aged population stating that the fear of failure would not prevent starting a business	GEM 2007-2011
<i>Know Entrepreneurs</i>	The percentage of the 18-64 aged population knowing someone who started a business in the past 2 years	GEM 2007-2011
<i>Career</i>	The percentage of the 18-64 aged population saying that people consider starting business as good career choice	GEM 2007-2011

<i>Status</i>	The percentage of the 18-64 aged population thinking that people attach high status to successful entrepreneurs	GEM 2007-2011
<i>Career Status</i>	The status and respect of entrepreneurs calculated as the average of Career and Status	GEM 2007-2011
<i>Opportunity Motivation</i>	Percentage of the TEA businesses initiated because of opportunity start-up motive (rather than necessity)	GEM 2007-2011
<i>Technology Level</i>	Percentage of the TEA businesses that are active in technology sectors (high or medium) and belong to the creative sector	GEM 2007-2011
<i>Educational Level</i>	Percentage of the TEA businesses owner/managers having participated over secondary education	GEM 2007-2011
<i>Competitors</i>	Percentage of the TEA businesses started in those markets where not many businesses offer the same product	GEM 2007-2011
<i>New Prod</i>	Percentage of the TEA businesses offering products that are new to at least some of the customers	GEM 2007-2011
<i>New Tech</i>	Percentage of the TEA businesses using new technology that is less than 5 years old average (including 1 year)	GEM 2007-2011

For the institutional/environmental variables, REDI complements its index with different sources. These are the followings:

- EUROSTAT Regional Database
- United Nations, Department of Economic and Social Affairs, Population Division
- EU Regional Competitiveness Index 2010
- World Bank – World Development Index, 34
- Legatum Prosperity Index,
- World Economic Forum,
- EU QoG Corruption Index,
- Heritage Foundation database,
- ESPON database,
- Cluster Observatory database,
- DGRegion Individual Datataset (not-published),
- Groh et al (2012) Global Venture.

The authors admit and discuss potential criticism– as with any other index – related to the apparently arbitrary selection of institutional variables and the neglect of other important factors (p.34). The description and calculation of the institutional variables can be found in the report on pp.137-141.

Main outputs

The REDI Report:

http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/regional_entrepreneurship_development_index.pdf

Annex 1.6: Digital Entrepreneurship Monitor²³⁴

General description

The Digital Entrepreneurship study is a European Commission's DG ENTR study (2013-2014). Among its activities, it developed a definition of digital entrepreneurship

Apart from defining digital entrepreneurship, the consortium made a conceptual model to give an overview of the areas where policymakers can intervene to support the development of digital enterprises. The conceptual model provides a thorough grounding consisting of 5 pillars that enable a categorisation for 13 areas or components for policy intervention. The Digital Entrepreneurship Model is shown below:



1. PILLAR I: Digital knowledge base and ICT market

- Support all businesses to embrace digital technologies and transform the way goods are made and delivered.
- Foster innovation by promoting the visibility of digital technologies and commercialization of new digital services and ideas.
- Encourage the start-up and up-scaling of digitized enterprises and new innovative businesses.

2. PILLAR II: Digital business environment

- Improve the ease of doing digital business to facilitate entry to markets and stimulate demand and the supply of digital technologies.
- Develop and enhance ICT infrastructure, trusted electronic payment systems, trustmarks and trademark registration systems to boost the use, ease of access and trust in digital markets.

3. PILLAR III: Access to finance

- Enhanced access to finance will assist the creation, survival and growth of digital entrepreneurs.
- Traditional and innovative forms of lending should be developed to support entrepreneurs.
- Fiscal and tax frameworks should be enhanced to enable all businesses to embrace digital technologies.

4. PILLAR IV: Digital skills and e-leadership

- A supportive education system that focuses on ICT and e-skills will strengthen the digital entrepreneurial environment.
- Increase the mobility, quantity and quality of high-end, multi-disciplinary digital skills and entrepreneurial talent.

5. PILLAR V: Entrepreneurial Culture

- A supportive entrepreneurial culture is fundamental to the development of digital entrepreneurs.

²³⁴ See at: <http://ec.europa.eu/enterprise/dem/monitor>

- Enhancing the digital entrepreneurial culture will improve the image of digital entrepreneurs and promote their role in society.

The Digital Entrepreneurship Model provides an underlying logic for intervention to support all SMEs; not just digital entrepreneurs. This model is central to the project since it provides a logical framework to collect and communicate information about initiatives and policies, relevant statistical indicators, opportunities and framework conditions for success.

The measurement framework

The DEM collects data on:

1. Digital Knowledge-base and ICT markets:²³⁵

- Percentage share of government budget spent on research and development,
- Number of European high-technology patents per million inhabitants,
- Percentage share of Gross Domestic Product spent in business research and development,
- Number of researchers per a thousand employees,
- Percentage of Gross Domestic Expenditure spent on research and development that is financed from abroad,
- Number of international scientific co-publications (per million inhabitants),
- Percentage share of foreign non-EU PhD candidates enrolled in higher education.

2. Digital Business environment:

- Summary Innovation Index: Composite indicator for national innovation performance (0 to 1 scale, 1 is highest).
- Percentage of 16-24 year olds indicating fear of failure as a barrier to entrepreneurship.
- Percentage of SMEs introducing product or process innovations.
- Consumer Confidence Index: Reflects optimism on the economy (-100 to 100 scale, '100' is everyone optimistic).
- Capacity of businesses to integrate new technologies into the firm (1 to 7 scale, '7' is high absorption).
- Intensity of competition within national markets (1 to 7 scale, '7' is most intense).
- Burden of complying with administrative requirements (1 to 7 scale, '7' is least burdensome).
- Percentage share of turnover achieved by sales of new innovations

3. Access to finances:

- Ease of doing business (world country ranking, '1' is most business friendly regulation)
- Burden of labour market regulations (1 to 10 scale, '10' is least burdensome)
- Number of start-up procedures required to register a business
- Cost of complying with tax regulations (1 to 10 scale, '10' is lowest cost)
- Tax rate as a percentage of commercial profits

²³⁵ Sources are detailed for each indicator within the corresponding webpage starting at: <http://ec.europa.eu/enterprise/dem/monitor/statistics#/home>

- Percentage share of enterprises using automated data exchange ICT systems outside the enterprise
- Percentage share of enterprises (excl. financial sector) selling at least 1 per cent of turnover online
- Percentage share of national households with a Broadband Internet Connection

4. Digital skills and e-Leadership

- Number of secure internet servers per 1 million people
- Percentage share of wholesale revenues invested in telecom networks
- Percentage share of enterprises with fixed or mobile broadband Internet access
- Percentage share of the national Gross Domestic Product spent on education
- Percentage share of the national labour force with a tertiary education qualification
- Percentage share of the national labour force in science and technology with skilled qualifications
- Percentage share of the national labour force in knowledge intensive activities
- Percentage share of employees in enterprises with qualified ICT skills
- Entrepreneurs' ease of access to venture capital funds (1 to 7 scale, '7' is easiest)
- Ease of Raising Money Through Local Equity Markets (1 to 7 scale, '7' is easiest)

5. Entrepreneurial culture

- Composite Entrepreneurship Index; combines attitudes, activities & aspirations (0 to 1 scale, '1' is highest)
- Global Entrepreneurship & Development Index - Attitude (0 to 1 scale, '1' is best attitude)
- Global Entrepreneurship & Development Index - Activity (0 to 1 scale, '1' is most active)
- Global Entrepreneurship & Development Index - Aspiration (0 to 1 scale, '1' is highest aspiration)

Main outputs

Digital Entrepreneurship Monitor: <http://ec.europa.eu/enterprise/dem/monitor>

DEM framework: http://ec.europa.eu/enterprise/sectors/ict/digital-entrepreneurship/index_en.htm

DEM interactive map: <http://ec.europa.eu/enterprise/dem/monitor/statistics#/home>

Annex 1.7: The Community Innovation Survey²³⁶

General description

The EUROSTAT Community Innovation Survey (CIS) is a survey of innovation activity in enterprises. The harmonised survey is designed to provide information on the innovativeness of sectors by type of enterprises, on the different types of innovation and on various aspects of the development of an innovation, such as the objectives, the sources of information, the public funding, the innovation expenditures etc.

The CIS based innovation statistics are part of the EU science and technology statistics. Surveys are carried out with two years' frequency by EU member states and a number of ESS member countries. Compiling CIS data is voluntary to the countries, which means that in different surveys years different countries are involved.

The CIS provides statistics broken down by countries, type of innovators, economic activities and size classes. New micro-data release normally takes place two and half years after the end of the survey reference period.

The measurement framework

The successive questionnaires delivered by EUROSTAT and the National Statistical institutes in each member states are fully available on the EUROSTAT CIS website.

The 2010 Questionnaire is structured as follows:

1. General information about the enterprise (Name; Address; Part of a group; Geographical market)
2. Product innovation (with details about partnerships; new to market/firm; share in turn-over; geographical reach)
3. Process innovation (with details about partnerships new to production process; to logistics; to support; new to market)
4. On-going or abandoned innovation activities for process and product innovations
5. Innovation activities and expenditures for process and product innovations
6. Sources of information and cooperation for product and process innovation
7. Objectives for your product and process innovation during 2008-2010
8. Factors hampering product and process innovation activities
9. Organisational innovation
10. Marketing innovation
11. Creativity and skills
12. Basic information on the enterprise (turn-over, size, skills)

Main outputs

CIS micro-data can be accessed via CD-ROMs (scientific-use files) and in the Safe Centre at Eurostat's premises in Luxembourg.

- The **CIS 2010** non-anonymised micro-data in the Eurostat Safe Centre covers 22 countries
- The **CIS 2008** anonymised CD-ROM release covers 16 countries
Non-anonymised Eurostat Safe Centre release covers 22 countries

²³⁶ See at: <http://epp.eurostat.ec.europa.eu/portal/page/portal/microdata/cis>

Annex 1.8: Enterprise Surveys (World Bank Group)²³⁷

"The Ease of Doing Business index, the Global Competitiveness Index, and the Index of Economic Freedom try to capture the institutional features of the participating countries (Djankov et al 2002, Miller and Holmes 2010, Sala-I-Martin et al. 2007; Porter and Schwab, 2008; Porter et al. 2007). At the same time in the context of entrepreneurship, while institutions are vital for development they provide only a part of the picture. The most important drawback of these indexes is their lack of microeconomic foundation." (Acs, Szerb, 2010)

General description

Since 2002, the World Bank has collected enterprise-level data from face-to-face interviews in 135 economies. The World Bank's Enterprise Analysis Unit conducts the Enterprise Surveys and draws upon this wealth of firm-level data from developing countries to produce research on the micro-economic foundations of growth.

Enterprise Surveys and Doing Business (See Annex 1.9) are complementary surveys, but different approaches to benchmarking the quality of the business environment across countries. They differ in their sources of information and in the types of business environment data that are collected.²³⁸

The Enterprise Survey is a firm-level survey of a representative sample of the private sector in an economy. The surveys cover a broad range of business environment topics including access to finance, corruption, infrastructure, crime, competition, and performance measures, while Doing Business focuses on measuring the complexity of business regulations and quantifying the ease of doing business across countries via indicator sets and rankings. The indicators cover common transactions such as starting a business or registering property based on standardized case-studies.

The measurement framework²³⁹

The indicators²⁴⁰ are organised around the following topics and amount to 137:

1. Regulations and taxes (9 indicators);
2. Corruption (14 indicators);
3. Crime (9 indicators);
4. Informality (5 indicators);
5. Gender (5 indicators);
6. Finance (21 indicators);
7. Infrastructure (18 indicators);
8. Innovation and technology (6 indicators);
9. Trade (14 indicators);
10. Workforce (12 indicators);
11. Firm characteristics (6 indicators);
12. The biggest obstacle (15 indicators);
13. Performance (3 indicators)

²³⁷ See at: <http://www.enterprisesurveys.org/data>

²³⁸ For details, see at: <http://www.enterprisesurveys.org/Methodology/Enterprise-Surveys-versus-Doing-Business>

²³⁹ Survey and other methodologies are fully described at: <http://www.enterprisesurveys.org/Methodology>.

²⁴⁰ All indicators are fully described at: <http://www.enterprisesurveys.org/~media/GIAWB/EnterpriseSurveys/Documents/Misc/Indicator-Descriptions.pdf>

All 137 indicators are fully described in IFC, 2014. Enterprise Survey. Indicators descriptions²⁴¹

They list as following:²⁴²

Regulations and Taxes

[reg1] Senior management time spent in dealing with requirements of government regulation (%)

[reg2] Average number of visits or required meetings with tax officials

[reg2_c] If there were visits, Average number of visits or required meetings with tax officials

[reg4] Percent of firms identifying tax rates as major constraint

[reg5] Percent of firms identifying tax administration as major constraint

[bus2] Days to obtain operating license

[bus3] days to obtain construction-related permit

[bus1] days to obtain an import license

[bus5] Percent of firms identifying business licensing and permits as major constraint

Corruption

[corr4] Percent of firms expected to give gifts to public officials (to get things done)

[corr3] Value of gift expected to secure government contract (% of contract)

[corr5] Percent of firms expected to give gifts to get a phone connection

[corr6] Percent of firms expected to give gifts to get an electrical connection

[corr7] Percent of firms expected to give gifts to get a water connection

[corr8] Percent of firms expected to give gifts to get a construction permit

[corr9] Percent of firms expected to give gifts to get an import license

[corr10] Percent of firms expected to give gifts to get an operating license

[corr1] Percent of firms expected to give gifts In meetings with tax officials

[corr2] Percent of firms expected to give gifts to secure a government contract**

[corr11] Percent of firms identifying corruption as a major constraint

[corr12] Percent of firms believing the court system is fair, impartial and uncorrupted

[graft2] Bribery depth (% of public transactions where a gift or informal payment was requested)

[graft3] Bribery incidence (% of firms experiencing at least one bribe payment request)

[crime9] Percent of firms identifying the courts as a major constraint

²⁴¹ Available at:
<http://www.enterprisesurveys.org/~media/GIAWB/EnterpriseSurveys/Documents/Misc/Indicator-Descriptions.pdf>

²⁴² The Indicators are listed as such in the Enterprise survey documentation at:
<http://www.enterprisesurveys.org/~media/GIAWB/EnterpriseSurveys/Documents/Misc/Indicator-Descriptions.pdf>

Crime

[crime1] Percent of firms paying for security

[crime3] Losses due to theft and vandalism against the firm (% of annual sales)

crime3_c] if there were losses, average losses due to theft and vandalism (% of annual sales)

[crime2] Security costs (% of annual sales)

[crime2_c] If the establishment pays for security, average security costs (% of annual sales)

[crime5] Products shipped to supply domestic markets that were lost due to theft (% of product value)*

[crime8] Percent of firms identifying crime, theft and disorder as a major constraint

[crime10] Percent of firms experiencing losses due to theft and vandalism

Informality

[infor3] Percent of firms expressing that a typical firm reports less than 100% of sales for tax purposes

[infor1] Percent of firms competing against unregistered or informal firms

[infor2] % of firms identifying practices of competitors in the informal sector as a major constraint

[infor4] Percent of firms formally registered when started operations in the country

[infor5] Number of years firms operated without formal registration

Gender

[gend1] Percent of firms with female participation in ownership

[gend2] Proportion of permanent full-time workers that are female

[gend3] Proportion of permanent full-time non-production workers that are female *

[gend4] Percent of firms with a female top manager

[gend5] Proportion of permanent full-time production workers that are female *

Finance

[fin14] Percent of firms with a bank loan/line of credit

[fin1] Proportion of investments financed by internal funds (%)

[fin2] Proportion of investments financed by banks (%)

[fin3] Proportion of investments financed by supplier credit (%)

[fin4] Proportion of investments financed by equity or stock sales

[fin5] Proportion of investments financed by other financing sources (%)

[fin6] Proportion of working capital financed by internal funds (%)

[fin7] Proportion of working capital financed by banks (%)

[fin8] Proportion of working capital financed by supplier credit (%)

[fin9] Proportion of working capital financed by other financing sources (%)

[fin19] Proportion of working capital financed by external sources (%)
 [fin12] Percent of firms using banks to finance investments
 [fin13] Percent of firms using banks to finance working capital
 [fin10] Value of collateral needed for a Loan (% of the loan amount)
 [fin11] Proportion of loans requiring collateral (%)

[fin16] Percent of firms identifying access to finance as a major constraint
 [fin15] Percent of firms with a checking or savings account
 [fin17] Proportion of sales that are pre-paid (%)
 [fin18] Proportion of sales sold on credit (%)
 [fin20] Percent of firms not needing a loan
 [fin21] Percent of firms whose recent loan application was rejected

Infrastructure

[in1] Delay in obtaining an electrical connection (upon application)
 [in2] Number of electrical outages in a typical month
 [in3] Duration of a typical electrical outages (hours)
 [in3_c] If there were outages, average duration of a typical electrical outages (hours)
 [in15] Average total time of power outages per month
 [in4] Losses due to electrical outages (% of annual sales)
 [in4_c] If there were outages, average losses due to electrical outages (% of annual sales)
 [in5] Delay in obtaining a water connections (days)
 [in6] Number of water insufficiencies in a typical month*
 [in7] Duration of insufficient water supplies (hours)*
 [in7_c] If there were shortages, average duration of the water shortage (hours)*
 [in8] Delay in obtaining a mainline telephone connection (days)
 [in9] Percent of firms owning or sharing a generator
 [in10] Proportion of electricity from a generator (%)
 [in10_c] If a generator is used, average proportion of electricity from generator (%)
 [in11] Percent of firms identifying transportation as a major constraint
 [in12] Percent of firms identifying electricity as a major constraint
 [in14] Proportion of products lost to breakage or spoilage during shipping to domestic markets (%)*

Innovation and Technology

[t1] Percent of firms with internationally-recognized quality certification
 [t2] Percent of firms with annual financial statement reviewed by external auditor
 [t4] Percent of firms using technology licensed from foreign companies*

[t5] Percent of firms having its own website

[t6] Percent of firms using E-mail to communicate with clients/suppliers

Trade

[tr1] Days to clear direct exports through customs

[tr2] Days to clear imports from customs*

[tr4] Proportion of total sales that are domestic sales (%)

[tr5] Proportion of total sales that are exported directly (%)

[tr6] Proportion of total sales that are exported indirectly (%)

[tr15] Percent of firms exporting directly (at least 1% of sales)

[tr10] Percent of firms exporting directly or indirectly (at least 1% of sales)

[tr7] Proportion of total inputs that are of domestic origin

[tr8] Proportion of total inputs that are of foreign origin

[tr11] Percent of firms using material inputs and/or supplies of foreign origin*

[tr9] Percent of firms identifying customs and trade regulations as a major constraint

[tr14] Days of inventory of main input*

[tr12] Products exported directly lost due to theft

[tr13] Products exported directly lost due to breakage or spoilage (%)

Workforce

[wk1] Percent of firms offering formal training

[wk2] Proportion of workers offered formal training (%)*

[wk3] Number of permanent skilled production workers*

[wk4] Number of unskilled production workers *

[wk6] Number of permanent production workers*

[wk7] Number of permanent non-production workers*

[wk8] Years of the top manager's experience working in the firm's sector

[wk9] Percent of firms identifying labour regulations as a major constraint

[wk10] Percent of firms identifying an inadequately educated workforce as a major constraint

[wk11] Number of temporary workers

[wk12] Number of permanent full time workers

[wk13] Proportion of unskilled workers (out of all production workers) (%)*

Firm Characteristics

[car1] Age (years)

[car2] Proportion of private domestic ownership in a firm (%)

[car3] Proportion of private foreign ownership in a firm (%)

[car4] Proportion of government/state ownership in a firm (%)
[car5] Proportion of other ownership in a firm (%)
[car6] Proportion of a firm held by the largest owner(s) (%)

The Biggest Obstacle

[obst1] Access to finance
[obst2] Access to land
[obst3] Business licensing and permits
[obst4] Corruption
[obst5] Courts
[obst6] Crime, theft and disorder
[obst7] Customs and trade regulations
[obst8] Electricity
[obst9] Inadequately educated workforce
[obst10] Labour regulations
[obst11] Political instability
[obst12] Practices of competitors in the informal sector
[obst13] Tax administration
[obst14] Tax rates
[obst15] Transport

Performance

[perf1] Real annual sales growth (%)
[perf2] Annual employment growth (%)
[perf3] Annual labour productivity growth (%)
[t3] Capacity utilization (%) *

Main outputs

Firm-level datasets, the investment climate indicators derived from them, as well as research papers are available on the website.

Country reports and profiles, as well as topic analysis are available respectively from <http://www.enterprisesurveys.org/Reports> and from <http://www.enterprisesurveys.org/Topic-Analysis>.

Two types of research papers are featured:

1. Enterprise Notes are research briefings with concise empirical findings and policy implications.
2. Research Papers are journal articles or academic working papers.

Data is available at: <http://www.enterprisesurveys.org/Data>.

Leaflet: <http://www.enterprisesurveys.org/About-Us/~media/GIAWB/EnterpriseSurveys/Documents/Misc/What-is-Enterprise-Surveys.pdf>

Annex 1.9: Doing Business (World Bank Group)²⁴³

General description²⁴⁴

The *Doing Business* project, launched in 2002, measures the efficiency and strength of laws, regulations and institutions that are relevant to domestic small and medium-sized companies throughout their life cycle.

By gathering and analyzing comprehensive quantitative data to compare business regulation environments across economies and over time, *Doing Business* encourages countries to promote more efficient regulation; offers measurable benchmarks for reform; and serves as a resource (...).

Doing Business does not measure all aspects of the business environment that matter to firms and investors. For example, it does not measure security, macroeconomic stability, corruption, the level of skills, or the strength of financial systems.

The first *Doing Business* report, published in 2003, covered five indicator sets and 133 economies. The 2014 report covers 11 indicator sets and 189 economies. The report updates all the indicators as of June 1 each year; ranks economies on their overall “ease of doing business” across 10 topics; and analyzes reforms to business regulation – identifying which economies are strengthening their business regulatory environment the most.²⁴⁵

In an additional dataset dedicated to Entrepreneurship,²⁴⁶ *Doing Business* addresses entrepreneurial activity. Annual data is collected directly from 139 company registrars on the number of newly registered firms over the past nine years. The data aims at answering such questions as these:

- What are the trends in new firm creation across regions and income groups?
- What is the relationship between entrepreneurship and the business environment and financial development?
- How much did the financial crisis affect entrepreneurial activity in the formal sector?

Data is provided on new business entry density, defined as the number of newly registered corporations per 1,000 working-age people (those ages 15–64). As in the World Bank’s annual *Doing Business* report, the units of measurement are private, formal sector companies with limited liability.

The measurement framework²⁴⁷

In constructing the indicators the *Doing Business* project uses 2 types of data. The first comes from readings of laws and regulations in each economy. Data of the second type serve as inputs into indicators on the complexity and cost of regulatory processes. These indicators measure the efficiency in achieving a regulatory goal.

Doing Business 2014 measures regulations that affect the following 11 areas of everyday business activity.²⁴⁸

²⁴³ See at: <http://www.doingbusiness.org/>

²⁴⁴ Sourced from: <http://www.doingbusiness.org/about-us>

²⁴⁵ Source: <http://www.doingbusiness.org/~media/GIAWB/Doing%20Business/Documents/Miscellaneous/What-is-Doing-Business.pdf>

²⁴⁶ See at: <http://www.doingbusiness.org/data/exploretopics/entrepreneurship>

²⁴⁷ For more see at: <http://www.doingbusiness.org/~media/GIAWB/Doing%20Business/Documents/Annual-Reports/English/DB14-Chapters/DB14-About-Doing-Business.pdf>

²⁴⁸ Source: <http://www.doingbusiness.org/~media/GIAWB/Doing%20Business/Documents/Miscellaneous/What-is-Doing-Business.pdf>

Complexity and Cost of Regulatory Processes	
Starting a Business	Measures the procedures, time, cost and the paid-in minimum capital requirement for a small to medium-sized limited-liability company to start up and operate formally
Dealing with Construction Permits	Tracks the procedures, time and cost to build a warehouse – including obtaining necessary licenses and permits, completing required notifications and inspections, and obtaining utility connections
Getting Electricity	Analyzes the procedures, time and cost required for a business to obtain a permanent electricity connection for a newly constructed warehouse
Registering Property	Examines the procedures, time and cost involved in registering property, assuming a standardized case of an entrepreneur who wants to purchase land and a building that is already registered for commercial use
Paying Taxes	Addresses the taxes and mandatory contributions that a medium-sized company must pay or withhold in a given year, as well as measures of the administrative burden in paying taxes
Trading Across Borders	Looks at the time, cost and documents necessary to export and import a standardized cargo of goods
Strength of Legal Institutions	
Getting Credit	Explores two sets of issues—extent of credit information sharing and the effectiveness of collateral and bankruptcy laws in facilitating lending
Protecting Investors	Measures the strength of legal protections of minority investors against the misuse of corporate assets by company directors for their personal gain
Enforcing Contracts	Assesses the efficiency of the judicial system by following the evolution of a commercial sale dispute over the quality of goods and tracking the time, cost and number of procedures involved from the moment the plaintiff files the lawsuit until payment is received
Resolving Insolvency	Studies the time, cost and outcome of insolvency proceedings involving domestic entities
Employing Workers (not included in rankings)	Measures the regulation of employment, specifically as it affects the hiring and layoff of workers and the rigidity of working hours

The full methodology together with the questionnaires is available at: <http://www.doingbusiness.org/methodology>.

The specific Entrepreneurship questionnaire is available at: <http://www.doingbusiness.org/~media/GIAWB/Doing%20Business/Documents/Methodology/Survey-Instruments/DB14/Entrepreneurship-Survey-en.pdf>.

Main recent outputs

Since 2004, the Doing Business project has produced annual global reports, as well as numerous regional reports²⁴⁹. It also produced thematic, subnational and case studies reports which exhaustively cover business regulation and reform in different cities and regions within a nation. These reports provide data on the ease of doing business, rank each location, and recommend reforms to improve performance in each of the indicator areas. Selected cities can compare their business regulations with other cities in the country or region and with the 189 economies that Doing Business has ranked.

²⁴⁹ Respectively available at <http://www.doingbusiness.org/reports/global-reports/doing-business-2014> and <http://www.doingbusiness.org/Reports/Regional%20Reports>

Annex 1.10: EU Flash Barometer Survey on Entrepreneurship²⁵⁰

General description

The European Commission's Directorate-General "Enterprise and Industry" has been studying the development of entrepreneurship in EU Member States for over a decade through a survey on entrepreneurial mindsets. The results help EU policy makers to understand problems and develop future policy responses, in particular in the European Commission's Europe 2020 strategy.

The measurement framework

The latest edition of the survey - "Entrepreneurship in the EU and beyond" - covers the 27 countries comprising the EU at the time, as well as the EEA/EFTA countries (Norway, Iceland, and Switzerland), and 10 more non-EU countries; for the first time Brazil, Israel, India and Russia. Over 42,000 respondents from different social and demographic groups were interviewed.

The survey is a questionnaire-based one. The questionnaire is fully accessible in the Annexes of the 2012 Analytical survey report²⁵¹ and covers a broad range of topics covering the socioeconomic profile of the interviewee as well as his views on self-employment or entrepreneurship such as:

Drivers of entrepreneurship

1. Feasibility and desirability of self-employment
2. Experience of starting up a business
3. Business started vs. business never started
4. Key considerations for starting up a business or taking over an existing one
5. Starting up a business vs. taking over an existing one
6. Fears when starting up a business
7. Difficulties encountered when starting up a business
8. People's plans if inheriting a significant amount of money

Perceptions of entrepreneurship and the role of education

1. Perceptions of entrepreneurship
2. Perceptions of different employment types
3. The role of education in entrepreneurship activity

Entrepreneurs

1. Reasons why people would prefer to be self-employed
2. Reasons for starting up a business
3. How the self-employed started their business
4. Source(s) of income for the self-employed

Employees

1. Reasons why people would prefer to be employees
2. Types of companies preferred
3. Reasons to work for a family business or a private company

Main outputs

The report is published since 2000. The 2012 report "Entrepreneurship in the EU and beyond", its summary and 40 country reports are all available at: http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/eurobarometer/index_en.htm.

Earlier survey results, from 2000 to 2009, are also available under the same link.

²⁵⁰ See at: <http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/eurobarometer/>

²⁵¹ In the Technical Specifications beyond p.173

Annex 1.11: Panel Study of Entrepreneurial Dynamics – PSED²⁵²

This project of the University of Michigan provides a dataset for analysis, focused on nascent entrepreneurs. It has hence a scientific analytical purpose rather than a policy support descriptive one.

General description

The Panel Study of Entrepreneurial Dynamics (PSED) research program, launched in 1988, is designed to enhance the scientific understanding of how people start businesses. It is focused on the US. The projects provide data on the process of business formation based on nationally-representative samples of nascent entrepreneurs, those active in business creation. The information obtained includes data on the nature of those active as nascent entrepreneurs, the activities undertaken during the start-up process, and the characteristics of start-up efforts that become new firms.

The measurement framework

The conceptual and measurement framework is explained in Paul D. Reynolds and Richard T. Curtin, 2007. Panel Study of Entrepreneurial. Program Rationale and Description. Questionnaires and codes are made public at <http://www.psed.isr.umich.edu/psed/documentation> and <http://www.psed.isr.umich.edu/psed/background>.

Main outputs

Two U.S. longitudinal studies of business creation, PSED I and II, have been completed. Both projects begin with the screening of representative samples of U.S. adults to locate those active in the business creation process. Those that qualified as nascent entrepreneurs were then contacted for follow-up interviews to determine the outcome of their efforts to create new firms.

The result of this effort has been two large scale, multi-wave data sets. The screening and four waves of the PSED I resulted in a data set of 1,261 cases (830 nascent entrepreneurs) and over six thousand variables. The screening and six waves of the PSED II has resulted in a data set of 1,214 cases (all nascent entrepreneurs) and over eight thousand variables.

While the PSED data sets have been widely used for a variety of analyses, its usefulness may be enhanced if there was access to a consolidated data set that could provide harmonized measures of transitions and outcomes for all PSED I and PSED II cases.

The 127 variables provide standardized measures of the timing and nature of critical start-up activities and transitions. Measures of the start-up process outcome—profitable new firm, still active with the start-up, disengagement—are standardized for 1,599 cases that met the criteria for active nascent entrepreneur and for which a follow-up interview was completed. Six years after entry into the start up process, 30% have reported a period of initial profits and 48% have disengaged (quit). Further, there are 427 cases that report the beginning of profitable operations. Follow-up interviews were completed with these profitable new firms, in both projects. This provides a longitudinal description of the early years of profitable new firms. Three years after beginning profitable operations 75% are still in operation. Given the wealth of information about the PSED cases during their start-up period, this facilitates assessment of the effect of the start-up activities on subsequent new firm growth and survival.

Data is fully available at: <http://www.psed.isr.umich.edu/psed/data>. The publication that has inspired the PSED project is the following:

²⁵² See at: <http://www.psed.isr.umich.edu/psed/home>

- J Haltiwanger, L Lynch, and C Mackie (2007). Understanding Business Dynamics: An Integrated Data System for America's Future. National Academies Press, Washington, DC.

Annex 1.12: The comparative entrepreneurship data for international analysis (COMPENDIA)

General description

The acronym COMPENDIA stands for "COMParative ENtrepreneurship Data for International Analysis".

The dataset COMPENDIA contains harmonized data on the number of business owners and the business ownership rate (number of business owners as share of labour force) for 30 OECD countries over the period 1970-2007. The dataset contains 30 OECD-countries, and covers 3 complementary sectors: agriculture, hunting, forestry and fishing (=agriculture); government; private sector excluding agriculture. The dataset has no size-class distribution.

The authors claim that business ownership rates have been made comparable across countries and over time. For that purpose figures from official OECD statistics have been corrected for deviating business ownership definitions and for trend breaks.

Measurement framework

The dataset contains 15 variables:

- business owners
- business ownership rate
- gross domestic product
- gross domestic product per capita
- employment
- unemployment
- labour productivity
- labour force
- share in total GDP
- share in total employment
- labour income share
- female labour share (FLS)
- average firm size by number of workers
- average firm size by GDP
- population
- population density.

The main data sources are:

- *OECD National Accounts (Volume II: detailed tables)*
- *OECD Labour force statistics*
- *OECD Main Economics Indicators*
- *OECD Historical Statistics*
- *OECD Employment Outlook June 2000*
- *ILO Yearbook of labour statistics*
- *The European Observatory for SME's: sixth report*

More information on methodology is available at:

<http://data.ondernemerschap.nl/Webintegraal/WebDataSets/Toelichtingen/Compendia.htm>.

Main outputs

Van Stel, 2008. [Measuring Entrepreneurship](#), in [International Studies In Entrepreneurship](#) Volume 16, 2008, pp 65-84. At: http://rd.springer.com/chapter/10.1007%2F978-0-387-72288-7_5#page-1

Annex 2: Entrepreneurship – EU policies²⁵³

This chapter aims at briefly presenting the current EU policies regarding entrepreneurship and digital entrepreneurship. The following pages list and describe, usually in the terms of the publicly available documents, the various policies and initiatives taken. The report has no ambition to be exhaustive neither fully up-to-date: this would be an impossible task.²⁵⁴

The following Commission's policy initiatives are briefly described below, respecting as far as possible, a chronological order:

- Annex 2.1 European Charter for SMEs (2000),²⁵⁵
- Annex 2.2 Green Paper 'Entrepreneurship in Europe', (2003),
- Annex 2.3 Action Plan: The European Agenda for Entrepreneurship' (2004),²⁵⁶
- Annex 2.4 Entrepreneurship Indicators Programme - EIP²⁵⁷ (2006),
- Annex 2.5 Competitiveness and Innovation Framework Programme – CIP (2007-2013),
- Annex 2.6 The Small Business Act for Europe – SBA (2008),
- Annex 2.7 SBA point of action: Improving the business environment ,
- Annex 2.8 SBA point of action: Promoting Entrepreneurship Actions,
- Annex 2.9 SBA point of action: Entrepreneurship 2020 Action Plan (2013),²⁵⁸
- Annex 2.10 Digital Entrepreneurship at DG ENTR (DEM),
- Annex 2.11 Web Entrepreneurs - Startup Europe (DG CNECT).

This overview allows us to better understand the chronology of the public intervention, how the topics have been delimited and who major players are. It is within this framework, and to serve it at best, that the present report has been developed.

The rationale for an entrepreneurship policy at EU level is expressed by the European Commission' DG Enterprise as following:

"Small firms depend on entrepreneurs - the individuals who have the ideas and are willing to take the risks necessary to get a firm off the ground. Europe needs more entrepreneurs and the Commission is looking at ways in which potential entrepreneurs may be encouraged to set up firms.

First, there are cultural factors which discourage too many people from starting a business. We need to develop a more entrepreneurial culture, starting with young people

²⁵³ This brief orientative inventory covers the period until end 2014. New initiatives have blossomed since, in particular the setting-up of the Junkers Commission (2014-2019).

²⁵⁴ In particular it does not enter the details of the activities of the European Investment Fund (http://www.eif.org/news_centre/publications/eif_support_for_SMEs.htm), specialised topic such as Social entrepreneurship, or broader programmes integrating entrepreneurship like the Employment Package of 2012 (<http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52012DC0173>). Also, from an empirical perspective, EUROSTAT proposes an overview of SME policies at EU level, with a focus on the data collection and analysis. See at: http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Small_and_medium-sized_enterprises

²⁵⁵ It is worth mentioning that the Charter, and its reference to entrepreneurship, were preceded by a Communication of the Commission dating back to 1998: European Commission, 1998. Fostering Entrepreneurship in Europe: priorities for the future. COM (98) 222 final. This document demonstrates the emergence of the topic in the late 90s.

²⁵⁶ Available at ftp://ftp.cordis.europa.eu/pub/incubators/docs/action_plan_on_entrepreneurship.pdf

²⁵⁷ More at: <http://www.oecd.org/industry/business-stats/theentrepreneurshipindicatorsprogrammeeipbackgroundinformation.htm>

²⁵⁸ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2012:0795:FIN:EN:PDF>

and from school education. Also there is too often a stigma attached to failure. Second, the administrative requirements - are often a major factor in putting entrepreneurs off. Third, entrepreneurs need to find it easier to attract investors.

The Commission is working with Member States, in particular by facilitating the [sharing of experiences](#) and fostering entrepreneurial attitudes. In addition, campaigns such as the [European SME Week](#) have been launched to promote the image of entrepreneurship.

Certain groups in society such as people from ethnic minorities face additional difficulties in trying to set up businesses, and special attention is given to helping overcome these. Other forms of enterprise, such as the co-operative, can play a significant role in economic growth, while firms such as craft enterprises can face specific problems. The Commission ensures that appropriate measures are taken to avoid such enterprises facing disadvantages in Europe's marketplace.

*All the actions supporting SMEs and entrepreneurship have a unique and comprehensive framework, the Small Business Act for Europe (SBA) which Member States have committed to implement alongside the Commission."*²⁵⁹

These few lines set the scene and indicate that the Entrepreneurship policies, focusing on the issues of Mindset, Training, Failure, and Finances are a subset of the SME policies and are subject to the Open Method of Coordination.

²⁵⁹ Copied from: http://ec.europa.eu/enterprise/policies/sme/promoting-entrepreneurship/index_en.htm

Annex 2.1: European Charter for SMEs (2000)²⁶⁰

The 'Charter for Small Enterprises', adopted on 13 June 2000 by the General Affairs Council, was endorsed at the Feira European Council on 19-20 June 2000. The European Charter for Small Enterprises is a self-commitment from the Member States to improve the business environment for small enterprises.

Under the Charter, Member States and the Commission took action to support small enterprises in ten key policy areas:

- Education and training for entrepreneurship;
- Cheaper and faster start-up;
- Better legislation and regulation;
- Availability of skills;
- Improving online access;
- Getting more out of the Single Market;
- Taxation and financial matters;
- Strengthening the technological capacity of small enterprises;
- Making use of successful e-business models and developing top-class small business support;
- Developing stronger, more effective representation of small enterprises' interests at Union and national level.

Activities and progress in these areas was documented until 2005 in the annual Charter Reports. While in 2006, reporting on the Charter was integrated in the Lisbon Reporting, the exchange of Good practices on SME policy under the Charter continued with an ever-increasing participation from Member States.

The main instrument to discuss the good practices were the annual Charter conferences, co-organised from the European Commission together with the respective Council Presidency. The conference attracted each year more than 350 policy makers and business organisations from more than 40 countries.

With the Small Business Act as the new framework for SME policy in place, the good practice exchange and the respective conference will continue from 2009 on under the Small Business Act.

More at:

The Charter:

http://ec.europa.eu/enterprise/policies/sme/documents/charter/index_en.htm and http://ec.europa.eu/enterprise/policies/sme/files/charter/docs/charter_en.pdf

The 2009 Conference: http://ec.europa.eu/enterprise/policies/sme/best-practices/charter/2009-conference/index_en.htm

²⁶⁰ It is worth mentioning that the Charter, and its reference to entrepreneurship, were preceded by a Communication of the Commission dating back to 1998: European Commission, 1998. Fostering Entrepreneurship in Europe: priorities for the future. COM (98) 222 final. This document demonstrates the emergence of the topic in the late 90s.

Annex 2.2: Green Paper 'Entrepreneurship in Europe' (2003)

The Council adopted the Charter for Small Enterprises (June 2000), setting out recommendations for small enterprises to take full advantage of the knowledge economy.

The European Commission started developing initiatives in this area, including annual implementation reports on Member States' and the Commission's efforts towards reaching the objectives of the Charter for Small Enterprises, the report on the Activities of the SME Envoy and a Communication on Innovation Policy.

In particular the Commission adopted in December 2001 a Communication on industrial policy in an enlarged Europe and the discussion on the Green Paper on entrepreneurship has to be seen in this context.

At the Barcelona Spring Council in 2002, the Council took note of the Commission's intention to present a Green Paper on Entrepreneurship. The importance of entrepreneurship was reaffirmed in the Commission's 2003 Spring Report to the Spring European Council which placed particular emphasis on boosting investment, jobs and growth through knowledge, innovation and business dynamism.²⁶¹

The Green paper table of content covers the following topics:

I. Introduction - Europe's entrepreneurial challenge

II. The Dynamics of Entrepreneurship

A. What is entrepreneurship?

B. Why is entrepreneurship important?

C. The European Union's entrepreneurial gaps and potential

III. Policy Options for Entrepreneurship

A. What does it take to produce more entrepreneurs?

i. Entry barriers

ii. Risk and reward

iii. Fostering capacity and skills

iv. Making entrepreneurship accessible to all members of society

B How can enterprises be geared to growth?

i. The regulatory environment

ii. Taxation

iii. Access to skilled labour

iv. Access to finance

v. Helping firms to exploit knowledge and international opportunities

vi. Intrapreneurship and corporate venturing

C. Towards an entrepreneurial society

i. More positive attitudes towards entrepreneurship

ii. Entrepreneurship's role in achieving social objectives

IV. The Way Forward

²⁶¹ Communication from the Commission, Choosing to grow: Knowledge, innovation and jobs in a cohesive society', Report to the Spring European Council, 21 March 2003 on the Lisbon strategy of economic, social and environmental renewal', COM (2003) 5, 14 January 2003.

- A. A co-ordinated approach to entrepreneurship policy
 - i. Co-ordinating entrepreneurship policy amongst all policy-makers
 - ii. Learning from the best
- B. Three pillars for action towards an entrepreneurial society
 - i. Bringing down barriers to business development and growth
 - ii. Balancing the risks and rewards of entrepreneurship
 - iii. A society that values entrepreneurship

The Green Paper motivates entrepreneurship policy with a section entitled: "*Measuring entrepreneurship*". *This section is copied below.* It is important to notice that the measurements proposed are rooted in surveys and analysis (Such as the Eurobarometer or Compendia), as those shown above, that equate entrepreneurship and the creation of new businesses.

People's preferences for self-employment

Europeans prefer employee over self-employed status according to the Eurobarometer survey. In Southern Europe, Ireland and the UK there is a relatively higher preference for self-employment. Compared to the EU average of 45%, as much as 67% of US citizens would prefer to be self-employed.

People's involvement in entrepreneurship

The incidence of entrepreneurs, including self-employed and business owners, varies widely across Europe, from around 6% in Denmark and Luxembourg to 13% in Spain, 15% in Portugal and over 18% in Greece and Italy. This compares with just over 10% in the US.

Regarding involvement in *new* entrepreneurial initiatives, the Eurobarometer survey reported that 4.5% of EU citizens are currently taking steps to start a business, have set up a business or taken one over in the last three years, ranging from over 6% in the UK and Ireland to less than 2% in France. At 13%, the rate in the US is significantly higher. More than twice as many Europeans than Americans gave up their efforts to start a business.

Entrepreneurial dynamism

Despite evidence suggesting a similar degree of "churning" (entry and exit rates of firms), in some European countries and the US, there is less entrepreneurial dynamism in Europe. US firms are on average smaller at birth than European firms, but (employment) expansion among successful entrants in the US is much stronger in the initial years after start-up. Entrepreneurs in the US appear to test the market by starting on a small scale and, if successful, expand rapidly, whereas in Europe many business ideas never even see the market as their viability is questioned even before they are tested in the market place.

Eurobarometer showed that 46% of Europeans agreed that "*one should not start a business when there was a risk it might fail*" against only 25% of US citizens. To illustrate the growth of entrepreneurial dynamism in the US, it took 20 years to replace one third of the Fortune 500 companies listed in 1960, against four years for those listed in 1998. Moreover, 8 out of America's 25 biggest firms today did not exist or were very small in 1960. In Europe, all of the largest firms in 1998 were already large in 1960.²⁴

Job creation

Despite efforts to reduce unemployment from 11% in the early 1990s and although rates vary between Member States, an average unemployment rate at 7.4% is still a major issue. In the second part of the 1990s, all Member States recorded positive annual birth rates for enterprises, but there is scope for further improvement. Europe has not developed so many of the fast-growing entrepreneurial ventures that are an important

job engine. During the first years of the 1990s, 19% of mid-sized firms in the US were classified as fast-growers, compared to an average of 4% in six EU countries.

More at:

European Commission (2003). Green Paper '*Entrepreneurship in Europe*', COM (2003) 27 final, 21 January 2003. Available at:

http://ec.europa.eu/invest-in-research/pdf/download_en/entrepreneurship_europe.pdf

Annex 2.3: Action Plan - The European Agenda for Entrepreneurship' (2004)²⁶²

As a follow-up to the Green Paper, the Council asked the Commission, at the Brussels European Council in March 2003, to present an Entrepreneurship Action Plan at the 2004 Spring European Council. This Action Plan provides a strategic framework for boosting entrepreneurship, based on the public consultation that followed the publication of the Green Paper. This consultation generally supported the Commission's ongoing activities but called for more effort in certain areas. Hence the Action Plan complements ongoing work, notably under the Multiannual Programme for Enterprise and Entrepreneurship²⁶³ adopted by Council Decision 2000/819/EC without changing the objectives and the areas of action described in this Decision, through focused actions.

On the basis of the public consultation, the Action Plan aimed to encourage more people to start businesses and to help entrepreneurs thrive by helping them to fully realise their ambitions and by providing an enabling business climate. To further the entrepreneurship agenda, the Commission would act in five strategic policy areas that the respondents to the Green Paper identified as being crucial for boosting the current entrepreneurial dynamism in the EU.

1. Fuelling entrepreneurial mindsets
 - a. Key action: Fostering entrepreneurial mindsets among young people
2. Encouraging more people to become entrepreneurs
 - a. Key action: Gearing entrepreneurs for growth and competitiveness
 - b. Key action: Providing tailor-made support for women and ethnic minorities
 - c. Key action: Supporting businesses in developing inter-enterprise relations
3. Improving the flow of finance
 - a. Key action: Creating more equity and stronger balance sheets in firms
4. Creating a more SME-friendly regulatory and administrative framework
 - a. Key action: Listening to SMEs
 - b. Key action: Reducing the complexity of complying with tax laws.

The Action plan also states that to implement the entrepreneurship agenda, the Commission will act where it can best achieve results at EU level and where it can give valuable support to the Member States' national and regional strategies under the open method of coordination.

The Commission will also pay due attention to advancing the entrepreneurship agenda within all other policy areas relevant for entrepreneurs, notably R&D and innovation, European governance, the EU sustainability agenda, the functioning of the Internal Market, the Employment Guidelines, taxation and competition policy. The Commission will increase the entrepreneurship orientation in its support programmes (Structural Funds, notably the EQUAL Programme, the Framework Programmes for RTD, Asia Invest, AL Invest, EU Japan Centre and Training, Education and Youth Programmes) and make access to them more business-friendly.

More at:

European Commission, 2004. Action Plan: The European agenda for Entrepreneurship. COM(2004) 70 final. Available at:

ftp://ftp.cordis.europa.eu/pub/incubators/docs/action_plan_on_entrepreneurship.pdf

²⁶² Available at: ftp://ftp.cordis.europa.eu/pub/incubators/docs/action_plan_on_entrepreneurship.pdf

²⁶³ 'Multiannual Programme for Enterprise and Entrepreneurship, and in particular for Small and Medium-Sized Enterprises (SMEs) (2001-2005)', Council Decision (2000/819/EC) of 20.12.2000, OJ L 333, 29/12/2000 p. 0084 - 0091.

Annex 2.4: Entrepreneurship Indicators Programme - EIP²⁶⁴ (2006)

The Entrepreneurship Indicators Programme (EIP) was launched in September 2006 as a joint OECD/EUROSTAT project, and operational since 2011, is the largest consensual public effort for measuring entrepreneurship dynamics through official statistics on business demography, both within EU member states and outside the EU.

It aims at developing policy-relevant and internationally-comparable indicators, based on an analytical model and measurement infrastructure that allow gathering harmonised and comparable data across countries. The Programme has initially produced methodological tools to structure the development and collection of indicators of entrepreneurship: the "[Eurostat-OECD Manual on Business Demography Statistics \(2007\)](#)", and the Working Papers "[Defining Entrepreneurial Activity: Definitions Supporting Frameworks for Data Collection \(2008\)](#)" and "[A Framework for Addressing and Measuring Entrepreneurship \(2008\)](#)".

Since 2011, the yearly publication "Entrepreneurship at a Glance" presents the actual collection of core indicators of entrepreneurial performance, as well as a selection of indicators of entrepreneurial determinants. Until then, states the OECD, most entrepreneurship research relied on ad hoc data compilations developed to support specific projects and virtually no official statistics on the subject existed. The collection of harmonised indicators presented in this publication and started in 2006 is a unique attempt to compile and publish international data on entrepreneurship from official government statistical sources.

The EIP has been described earlier in this report and in particular in Annex 1.1 as it encompasses a measurement framework

²⁶⁴ More at: <http://www.oecd.org/industry/business-stats/theentrepreneurshipindicatorsprogrammeipbackgroundinformation.htm>

Annex 2.5: Competitiveness and Innovation Framework Programme – CIP (2007-2013)

With small and medium-sized enterprises (SMEs) as its main target, the Competitiveness and Innovation Framework Programme (CIP) supports innovation activities (including eco-innovation), provides better access to finance and delivers business support services in the regions.

It encourages a better take-up and use of information and communication technologies (ICT) and helps to develop the information society. It also promotes the increased use of renewable energies and energy efficiency.

The CIP ran from 2007 to 2013 with an overall budget of €3621 million.

The CIP is divided into three operational programmes. Each programme has its specific objectives, aimed at contributing to the competitiveness of enterprises and their innovative capacity in their own areas, such as ICT or sustainable energy:

- The Entrepreneurship and Innovation Programme (EIP).
- The Information Communication Technologies Policy Support Programme (ICT-PSP).
- The Intelligent Energy Europe Programme (IEE).

he EIP, one of the specific programmes under the CIP,²⁶⁵ seeks to support innovation and small and medium enterprises (SMEs) in the EU, focusing on:

- [Access to finance](#) for SMEs through "CIP financial instruments" which target SMEs in different phases of their lifecycle and support investments in technological development, innovation and eco-innovation, technology transfer and the cross border expansion of business activities.
- Business services: the "[Enterprise Europe Network](#)". Business and innovation service centres all around the EU and beyond provide enterprises with a range of quality and free-of-charge services to help make them more competitive.
- Support for improving [innovation policy](#): Supports transnational networking of different actors in the innovation process and innovative companies, including benchmarking initiatives and the exchange of best practice.
- [Eco-innovation](#) pilot and market replication projects for the testing in real conditions of innovative products, processes and services that are not fully marketed due to residual risks and that are aimed at reducing environmental impacts, preventing pollution or achieving a more efficient use of natural resources.
- Support for innovation and [SME](#) policy-making through [contracts and grants](#): Analytical work and awareness raising activities (i.e. [conferences](#) and [studies](#)) on certain industrial sectors, SMEs or innovation policy are organised to inform and support policy-makers, and make policy suggestions to increase cooperation between EU Member States.

More at:

CIP Programme: <http://ec.europa.eu/cip/>

²⁶⁵ The other programmes being the ICT policy support programme (ICT PSP) and the Intelligent Energy Europe programme (IEE).

Annex 2.6: The Small Business Act for Europe – SBA (2008)

The Small Business Act for Europe (SBA) embodied the EU's commitment to SMEs and entrepreneurship. Member States have committed to implementing the SBA alongside the European Commission in an effort to make the EU a better place to do business.

The mission statement was clearly stated: The more than 20 million SMEs in the EU represent 99% of businesses, and are considered a key driver for economic growth, innovation, employment and social integration. The European Commission aims to promote successful entrepreneurship and improve the business environment for SMEs, to allow them to realise their full potential in today's global economy. The European Commission works on broad policy issues affecting entrepreneurship and SMEs across Europe, and assists SMEs through networks and business support measures. It helps existing and potential entrepreneurs to grow their businesses, giving special attention to women entrepreneurs, crafts and social economy enterprises.

Since SMEs have to be supported at local level, the Commission aimed at helping Member States and the regions to develop policies aimed at promoting entrepreneurship, assisting SMEs at all stages of development, and helping them to access global markets. The identification and exchange of good practices are key elements of this policy.

The full range of initiatives, among which the Entrepreneurship 2020 Action plan, are accessible from: http://ec.europa.eu/enterprise/policies/sme/index_en.htm. Some are further described below.

The European Small Business Portal

(http://ec.europa.eu/enterprise/policies/sme/index_en.htm) gathers together all the SME-related information and initiatives provided by the EU, ranging from practical advice to policy issues, from local contact points to networking links.

A brief overview of the history of implementation and main documents following the Small Business Act (Period 2008-2011) is available at:

http://ec.europa.eu/enterprise/policies/sme/small-business-act/implementation/index_en.htm.

Entrepreneurship and SMEs are (under the Barroso II Commission) under the responsibility of Directorate D "SME and Entrepreneurship" in DG ENTR. The Unit D.4 "SME policy development and Small Business Act" is focused on the implementation of the "Small Business Act".

Relevant readings

- COM(2008) 394 final. Think Small First. A "Small Business Act" for Europe {SEC(2008) 2101}{SEC(2008) 2102}. Brussels, 25.6.2008. Available at:

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0394:FIN:EN:PDF>

- What is an SME? EU Definitions.
http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/sme-definition/index_en.htm
- EU Annual reports on European SMEs.
http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/performance-review/index_en.htm

Annex 2.7: SBA point of action: Improving the business environment

The Commission is working in close co-operation with the Member States to make the business environment friendlier, both for existing SMEs and for any prospective entrepreneur wishing to start a firm. In many cases, the Member States and the Commission work together in identifying and exchanging good practices.

All the actions supporting SMEs and entrepreneurship have a unique and comprehensive framework which is the Small Business Act for Europe (SBA), which Member States have committed to implement alongside the European Commission.

The domains of action are the following:²⁶⁶

- [Start-up procedures](#),
- [Smooth transfer of businesses](#),
- [Regulatory burden](#),
- [Training and mobility for SMEs](#),
- [Management skills for SMEs](#) [Second career](#)
- [Environmental challenge](#),
- [Public Procurement](#),
- [Recruiting a first employee](#) ,
- [A second chance in business](#),
- [Taxation and SMEs](#),
- [Accounting and SMEs](#),
- [Employee stock options](#),
- [Cross-border outstanding claims project](#).

Entrepreneurship and SMEs are (under the Barroso II Commission) under the responsibility of Directorate D "SME and Entrepreneurship" in DG ENTR. The Unit D.1 "Entrepreneurship and Social Economy" is focused on the implementation of several of the above actions.

Relevant readings

- Business dynamics: start-ups, business transfers and bankruptcy
http://ec.europa.eu/enterprise/policies/sme/business-environment/files/business_dynamics_final_report_en.pdf
- Evaluation of Market Practices and Policies on SME Rating.
http://ec.europa.eu/enterprise/policies/finance/index_en.htm
- A history of simplification of start-up procedures is available at
http://ec.europa.eu/enterprise/policies/sme/business-environment/start-up-procedures/evolution_en.htm

²⁶⁶ They are fully described at: http://ec.europa.eu/enterprise/policies/sme/business-environment/index_en.htm

Annex 2.8: SBA point of action: Promoting Entrepreneurship Actions

The Commission is working with Member States, in particular by facilitating the sharing of experiences and fostering entrepreneurial attitudes. In addition, campaigns such as the European SME Week have been launched to promote the image of entrepreneurship.

Small firms depend on entrepreneurs - the individuals who have the ideas and are willing to take the risks necessary to get a firm off the ground. Europe needs more entrepreneurs and the Commission is looking at ways in which potential entrepreneurs may be encouraged to set up firms.

First, there are cultural factors which discourage too many people from starting a business. We need to develop a more entrepreneurial culture, starting with young people and from school education. Also there is too often a stigma attached to failure. Second, the administrative requirements - are often a major factor in putting entrepreneurs off. Third, entrepreneurs need to find it easier to attract investors.

Certain groups in society such as people from ethnic minorities face additional difficulties in trying to set up businesses, and special attention is given to helping overcome these. Other forms of enterprise, such as the co-operative, can play a significant role in economic growth, while firms such as craft enterprises can face specific problems. The Commission ensures that appropriate measures are taken to avoid such enterprises facing disadvantages in Europe's marketplace.

The domains of action are the following:

- Erasmus for Young Entrepreneurs
- Education & Training for Entrepreneurship
- Entrepreneurship in audiovisual media
- Women entrepreneurs
- Migrants / Ethnic minorities
- Craft and micro-enterprises
- Family Business
- Social Economy
- European SME Week

All the actions supporting SMEs and entrepreneurship have a unique and comprehensive framework, the Small Business Act for Europe (SBA) which Member States have committed to implement alongside the Commission.

Entrepreneurship and SMEs are (under the Barroso II Commission) under the responsibility of Directorate D "SME and Entrepreneurship" in DG ENTR. The Unit D.1 "Entrepreneurship and Social Economy" is focused on the implementation of several of the above actions

The above domains are fully described at:

http://ec.europa.eu/enterprise/policies/sme/promoting-entrepreneurship/index_en.htm

Annex 2.9: SBA point of action - Entrepreneurship 2020 Action Plan (2013)²⁶⁷

The Entrepreneurship Action Plan is part of the implementation of the Small Business Act, and in particular of its efforts for promoting and facilitating Entrepreneurship across Europe.

The Entrepreneurship Action Plan is meant to unleash Europe's entrepreneurial potential, to remove existing obstacles and to revolutionise the culture of entrepreneurship in Europe. Investments in changing the public perception of entrepreneurs, in entrepreneurship education and to support groups that are underrepresented among entrepreneurs are indispensable if we want to create enduring change.

The Entrepreneurship 2020 Action Plan is built on three main pillars:

1. Entrepreneurial education and training
2. Creation of an environment where entrepreneurs can flourish and grow, and
3. Developing role models and reaching out to specific groups whose entrepreneurial potential is not being tapped to its fullest extent or who are not reached by traditional outreach for business support.

The Action Plan and its key actions are followed up by the Commission through the competitiveness and industrial policy and the Small Business Act governance mechanisms.

The European Commission supports the Member States administrations implementing the Entrepreneurship 2020 Action Plan by providing its own know-how and foster peer learning and exchange of good practices with other Member States.

On a national level, it is the SME envoy, appointed by the respective national government, who is responsible for driving the implementation of the Action Plan.

The Communication on the Action Plan was preceded by a public consultation (2012 – See link below). The consultation did not target any specific group as all citizens and organisations were welcome to participate. However, contributions from public administrations, private sector organizations and individuals who support entrepreneurs in starting up businesses as well as individual entrepreneurs and businesses were of particular interest.

Entrepreneurship and SMEs are under the responsibility of Directorate D "SME and Entrepreneurship" in DG ENTR. The Unit D.1 "Entrepreneurship and Social Economy" is in charge of the implementation of the Entrepreneurship Action plan.

There is a specific chapter dedicated to Digitalisation in the Entrepreneurship 2020 Action Plan. Here is the extract:

Key Area 3: Unleashing new business opportunities in the digital age

"Better use of information and communication technology (ICT) can significantly help new businesses to thrive. ICT is the key source of growth for national economies and European SMEs grow two to three times faster when they embrace ICT. As indicated in the Commission Industrial Policy Communication,²⁶⁸ "entrepreneurs need to exploit the full potential of the digital single market in the EU that is expected to grow by 10% a year up to 2016."

Based on the Digital Agenda and the Industrial policy flagship initiatives, the Commission will help entrepreneurs and SMEs to fully exploit the potential of ICT, both in terms of

²⁶⁷ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2012:0795:FIN:EN:PDF>

²⁶⁸ A Stronger European Industry for Growth and Economic Recovery, Industrial Policy Communication Update, COM(2012)582 of 10 October 2012.

supply of new digital products and services, and in terms of demand and smart use of these technologies.

On the supply side, Web entrepreneurs constitute a specific category of entrepreneurs who create new digital services and products that use the web as an indispensable component. Web start-ups tend to grow and fail faster than other businesses and scale exponentially, which translates into higher rewards but also higher risks. They operate in a complex and fast moving eco-system, where networking and experimenting is paramount. Web start-ups are cheaper to set-up and the entry barriers are low, making them an attractive vehicle to start an entrepreneurial career. Web entrepreneurs require for that reason tailored support measures to structurally strengthen the web start-up ecosystem.

On the demand side, investing in digital technologies is no longer a choice: companies can nowadays only be competitive when they embrace the digital world. This poses opportunities and challenges, in particular for SMEs, since they are often less equipped to deal with the increased sophistication of new business models.

Digital entrepreneurs are those entrepreneurs that fully exploit digital products and services, including "cloud computing", to reinvent their business models and sharpen their competitiveness.²⁶⁹ The EU initiatives "Smart use of information technologies and the integration of SMEs in global industrial value chains", and e-Skills will promote the uptake of digital technologies and connect SMEs to the digital world. The potential of e-commerce as a part of the Digital Single Market opportunities for entrepreneurs is still not fully tapped. A number of specific actions will enhance trust towards online trade.²⁷⁰

The Commission will:

- Foster the knowledge base on major market trends and innovative business models, by establishing an online Market Monitoring Mechanisms and a Scoreboard, in cooperation with the main stakeholders, to facilitate dialogue and lead to a shared agenda for action.
- Raise awareness through a Europe-wide information campaign for entrepreneurs and SMEs on the benefits from the new digital evolutions; the campaign will promote European success stories, pan-European contests and prize award schemes to sensitise entrepreneurs on the changing business landscape and new business opportunities.
- Facilitate networking to sparkle and support new business ideas, such as: the creation of a European Mentors Network for training, advice and hands-on coaching on how to do business in the digital age, and match-making events among stakeholders to explore new partnerships.
- Launch specific actions for Web entrepreneurs such as: i) a Start-up Europe Partnership to unlock expertise, mentoring, technology and services, ii) a Web Entrepreneurs Leaders Club to bring together world-class web entrepreneurs and strengthen the web entrepreneurial culture in Europe; iii) a European network of web business accelerators; iv) work with European investors in order to increase the flow of venture capital and crowd-funding into web start-ups; and v) Fostering web talent by stimulating the emergence of Massive Online Open Courses²⁷¹ and the setting up of platforms for mentoring, and skill building.

²⁶⁹ COM(2012)529 "Unleashing the Potential of Cloud Computing in Europe".

²⁷⁰ COM(2011)942 of 11 January 2012. A coherent framework for building trust in the Digital Single Market for e-commerce and online services.

²⁷¹ See for example <http://www.radicalsocialeentreps.org/>, and <http://www.youtube.com/watch?v=iE7YRHxwoDs> and <http://www.academicmatters.ca/2012/05/themassive-open-online-professor/>

- *Strengthen competences and skills by intensifying its E-skills actions to improve leadership skills, scientific and creative disciplines, and managerial and entrepreneurial skills to address new technological and markets.*

The Member States are invited to:

- *Reinforce national or regional support for digital and web start-ups and foster alternative financing for early-stage technology start-ups, such as ICT innovation voucher schemes.*
- *Promote access for entrepreneurs to Open Data and Big Data compiled in public or industry-backed programs such as the cultural data set Europeana. 47*
- *Support the most talented entrepreneurs, e.g. by encouraging, the brightest graduates to begin their career in start-ups.*
- *Support the swift adoption of on-going policy initiatives such as the data protection reform and the proposal for a Common European Sales Law which will lower barriers to the uptake of cloud computing in the EU.*
- *Ensure the best use of European funds for web and digital entrepreneurship according to the applicable rules and priorities."*

Relevant readings

- Public consultation on The Entrepreneurship 2020 Action Plan:
http://ec.europa.eu/enterprise/policies/sme/public-consultation/past-consultations/index3_en.htm
- Report on the results of public consultation on The Entrepreneurship 2020 Action Plan
http://ec.europa.eu/enterprise/policies/sme/files/entrepreneurship-2020/final-report-pub-cons-entr2020-ap_en.pdf
- COM(2012) 795 final. Entrepreneurship 2020 Action Plan. Reigniting the entrepreneurial spirit in Europe. Brussels, 9.1.2013
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2012:0795:FIN:EN:PDF>

Annex 2.10: Digital Entrepreneurship at DG ENTR (DEM)

Under the umbrella of the Entrepreneurship 2020 Action Plan, and based on intensive dialogue with stakeholders and policy analysis, a policy framework has been developed to describe the vision and key priority areas for policy intervention. The framework is structured along five pillars, each describing key factors influencing digital entrepreneurship. The Commission is committed to working towards the deployment and implementation of the aforementioned vision and five-pillar strategy.

The DEM has been already described earlier in the report and in particular in Annex 1 as it integrates a tentative measurement framework: The Digital Entrepreneurship Monitor.

The vision: Europe's ambition is to create new business opportunities and accelerate the transformation of its business landscape through novel digital technologies in order to increase growth and create employment.

The digital economy is developing rapidly worldwide. Novel technological trends, such as mobile and social solutions, cloud computing and data analytics offer a new range of opportunities for business services in the knowledge economy. (...) How well and how quickly European businesses adopt digital technologies will be a key determinant of growth in future years. However, this huge potential is dramatically under-exploited in Europe, with 41% of enterprises being non-digital and only 2% taking full profit of the digital opportunities.

Digital entrepreneurship embraces all new ventures and the transformation of existing businesses by creating and using novel digital technologies. Digital enterprises are characterised by a high intensity of utilisation of novel digital technologies (particularly social, big data, mobile and cloud solutions) to improve business operations, invent new business models, sharpen business intelligence, and engage with customers and stakeholders. They create the jobs and growth opportunities of the future.

The pillars are further described at: http://ec.europa.eu/enterprise/sectors/ict/digital-entrepreneurship/index_en.htm.

The Directorate General of Enterprise and Industry has launched a set of actions to boost digital entrepreneurship in Europe:

- the Strategic Policy Forum on Digital Entrepreneurship (started in February 2014).
- the study on "Doing Business in the Digital Age"
- The Digital Entrepreneurship Monitor
- A major pan-European awareness raising campaign and eMentoring ecosystem (started in January 2014)
- Studies to analyse competences and e-leadership skills
- Specific actions for Web entrepreneurs.

More initiatives (i.e. Whatify) have been initiated since the editing of this report.

Under the Barroso II Commission, Entrepreneurship and SMEs are under the responsibility of Directorate D "SME and Entrepreneurship" in DG ENTR. The Unit E4 "Key enabling technologies and Digital economy" is in charge of the implementation of the digital entrepreneurship activities.

Relevant readings

- Study report: Doing business in the digital age: the impact of new ICT developments in the global business landscape. Europe's vision and action plan to foster digital entrepreneurship.
http://ec.europa.eu/enterprise/sectors/ict/files/ebsn/study_market_analysis_and_foresight_scenarios_report_final_en.pdf
- Digital Entrepreneurship Monitor: <http://ec.europa.eu/enterprise/dem/>

- eSkills for Jobs: http://ec.europa.eu/enterprise/sectors/ict/e-skills/index_en.htm
- Strategic Policy Forum on Digital Entrepreneurship:
http://ec.europa.eu/enterprise/sectors/ict/digital-entrepreneurship/strategic-policy-forum/index_en.htm
- ENTR/E4 - Fuelling Digital Entrepreneurship in Europe - Background paper to the Strategic Policy Forum on Digital Entrepreneurship.
<http://ec.europa.eu/DocsRoom/documents/5313>

Annex 2.11: Web Entrepreneurs - Start up Europe (DG CNECT)

Start-up Europe is an initiative developed by DG CNECT. It aims to strengthen the business environment for web and Digital entrepreneurs so that their ideas and business can start and grow in the EU.

It promotes entrepreneurship, as reflected in the Entrepreneurship 2020 Action Plan. Start-up Europe is presented as the contribution of former Vice President Neelie Kroes to this plan and has developed in complement to the DEM.

Startup Europe's objectives are:

- to reinforce the links between people, business and associations who build and scale up the start-up ecosystem (e.g. the Web Investors Forum, the Accelerator Assembly, the Crowdfunding Network ...).
- to inspire entrepreneurs and provide role models (e.g. the Leaders Club and their Startup Manifesto, the Start-up Europe Roadshow).
- to celebrate new and innovative start-ups (with Tech All Stars and [Europioneers](#)), help them to expand their business (Start-up Europe Partnership, [ACE Acceleration Programme](#)), and give them access to funding under Horizon 2020.

The programme is divided into 4 pillars or areas of research and networking: crowdfunding, accelerators, social media, and investors (the Web Investors Forum).

ICT startups can access support services such as advice, networking and legal assistance, from EU funded projects on the [Startup Europe Hub website](#). A Dynamic Mapping of the ICT start-ups ecosystem is also planned: it is one of the mapping initiatives presented earlier in this report.

The Directorate General of Communication Networks, Content and Technology (CNECT), has launched a set of actions under the banner of Web Entrepreneurship in Europe:

- The Startup Europe Partnership (SEP) aims at building bridges between Europe's startup, corporate, education institutions and investment communities to help EU startups raise funds and beat language barriers to reach maturity as global champions. SEP has launched the Dynamic mapping initiative, to gather evidence on EU ICT start-ups and scale-ups. <http://ec.europa.eu/digital-agenda/en/startup-europe-partnership>
- Launched in September 2013, the ACE programme is meant to provide innovative start ups and high growth ICT companies with direct assistance in finding partners, clients and financing to accelerate their move into cross border and international markets. The ACE consortium includes 15 leading incubators, clusters and living labs from across Europe (UK, Ireland, Belgium, Luxembourg, France, Italy, Portugal, Finland, Sweden, Czech Republic) and is supported by EBN, the largest network of innovation based incubators in Europe and ENOLL, the European network of Living Labs. See: <http://europeanace.eu/index.php/about-us>
- The Start-up Europe Accelerators Assembly is an initiative to support and promote web-friendly accelerators in Europe, with the aim of stimulating the growth of web start-ups and enabling them to become successful, sustainable businesses that will contribute to the economic growth and to the creation of employment. Three of Europe's leading web-friendly support programmes – Seedcamp, Start-up Weekend and Bethnal Green Ventures – have formed a consortium with Seed-DB, the seed accelerator database, in response to this opportunity, with the aim of delivering an industry-led forum with maximum pan-European reach and impact. <http://www.acceleratorassembly.eu/>

- The Web Investor Forum aims at working with a community of investors in web businesses and mobile tech, in order to foster the emergence of digital champions in Europe. Its mission is to map and quantify investments in web businesses and promote a European investment culture in the web in order to increase the flow of venture capital and crowd-funding into web start-ups.
<http://webinvestorsforum.eu/>
- The Crowdfunding Network aims at acquiring additional data and knowledge about the current status of the web related crowdfunding sector in Europe, drawing conclusions on the possible measures which would further strengthen the crowd funding environment in the EU, support higher visibility and accessibility of existing crowd funding opportunities for web entrepreneurs Europe wide, contribute to strengthening the links and networking between existing European crowdfunding platforms, and raise the level of education of funders and web entrepreneurs as regards investment opportunities and access to finance through crowdfunding. <http://www.crowdfundingnetwork.eu/>
- The Leaders Club is an independent group of founders in the field of tech entrepreneurship, who act as role models for European web entrepreneurs and provide guidance to the Commission on what needs to be done to strengthen the environment for web entrepreneurs to start in Europe and stay in Europe. The members of the Leaders Club have launched the Startup Manifesto campaign for entrepreneurial excellence.

<http://ec.europa.eu/digital-agenda/leaders-club>

- The [Startup Europe Roadshow](#) allows young aspiring entrepreneurs to interact, learn and be mentored by “role-models” – young Digital entrepreneurs share their success stories, as part of efforts to make Europe’s start-up environment more dynamic and less risk averse. The Roadshow consists of a series of 10 workshops in Poznan, Paris, Berlin, Olomouc, Athens, London, Madrid, Bucharest, Lisbon and Budapest and is organized in collaboration with the European young innovators' Forum (EYIF)’s hubs in the respective countries.

<http://younginnovator.eu/startupeuroperoadshow/#sthash.w83afDv0.dpuf>

- The Tech All Stars is a Competition for Europe's best Startups from EU accelerators, incubators and web camps. Tech All Stars invites 12 of the best young European startups to the most prestigious startup events across Europe and gets them connected to top EU funding sources, successful entrepreneurs and other influential individuals. <http://ec.europa.eu/digital-agenda/tech-all-stars>
- StartUpEuropeHub provides a platform where innovative ICT start-ups can access support services to help their businesses grow. Support is available to help them throughout their development, from raising capital, accessing legal advice, through to moving into new international markets. The services provided on StartUpEuropeHub are implemented by different EU funded projects. There are currently seven projects ²⁷² providing services to ICT start-ups through StartUpEuropeHub. <http://www.startupeuropehub.eu/>

²⁷² ACE helps innovative start-ups in the ICT sector to accelerate their growth across borders. ATALANTA supports groups of leading accelerators to help them deliver cross border services to innovative entrepreneurs. The project helps link these innovators with mentors, investors, and clients from across Europe. European Investment Gate helps entrepreneurs and research institutions to access finance, through training and advice at all stages of their growth. Equally it allows investors to gain early access to innovative companies, to identify attractive investment opportunities. GET eHealth focuses on SMEs working in eHealth. It provides a series of different services: helping firms to access funding, grow internationally, or to help bridge gaps in the market.

The Web Entrepreneurs activities are (under the Barroso II Commission) under the responsibility of Directorate E "Net Futures" 'in DG CNECT. The Unit DDG1.E.3 "Net innovation", and its team 002 "Web Entrepreneurs" is in charge of the implementation of StartUp Europe.

Relevant readings

- Manifesto for Entrepreneurship and innovation
https://ec.europa.eu/digital-agenda/sites/digital-agenda/files/Manifesto_Digital.pdf
- Proceedings of the High level Workshop on Crowd funding and Web entrepreneurship, 4th June 2013, Brussels, Belgium.
<http://www.crowdfundingnetwork.eu/wp-content/blogs.dir/17/files/2013/08/Crowdfunding-for-Webentrepreneurs-Workshop-Proceedings.pdf>
- Startup Europe Crowdfunding Network – Final Report 2014.
http://www.crowdfundingnetwork.eu/files/2014/05/20140519_Final-Report_Startup_Europe_Crowdfunding_Network.pdf

ICT2B aims to put ICT researchers in contact with entrepreneurial individuals from across Europe. It will help to develop entrepreneurial and innovative ICT start-ups based on cutting edge technologies and research.

iLINC is the place to go for legal advice concerning ICT start-ups. iLinc helps bring together entrepreneurs with postgraduate students from leading academic law institutions.

OpenAxel and its Open Acceleration Community Portal put innovative start-ups in contact with investors and partners from across Europe.

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